Bee Game Namespace, Class, & File Documentation

Bee Game Version 0.1 - Minecraft Pre 0.0.9a Equivlent

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Part I

Namespace Documentation

0.1 BeeGame Namespace Reference

Namespaces

- namespace Blocks
- namespace Core
- namespace Inventory
- namespace Items
- namespace Player
- namespace Resources
- namespace Serialization
- namespace Terrain

Classes

- class LoadResources

  Loads all of the resources in the game
- class Test

0.2 BeeGame.Blocks Namespace Reference

Classes

- class Air

  Air Block is an empty block that does not render and has no collider
- class Apiary

  Apiary Block
- class Bedrock

  Bedrock Block
- class Block

  Base class for blocks
- class Dirt

  Dirt Block
- class Grass

  Grass Block

0.3 BeeGame.Core Namespace Reference

Namespaces

- namespace Enums

Classes

- class Extensions
- class PrefabDictionary

  The prefabs avaliable to the game
- class SpriteDictionary

  All of the sprites avaliable to the game
- class THInput

  My implementation of the unity input system. Acts as a buffer layer to the unity system so that the input keys can be changed at runtime
- struct THVector2

  Serilializable version of Vector2
- struct THVector3

  Serializable version of Vector3

0.4 BeeGame.Core.Enums Namespace Reference

Enumerations

- enum Direction {
  Direction.NORTH, Direction.EAST, Direction.SOUTH, Direction.WEST,
  Direction.UP, Direction.DOWN }

  Direction in the game

0.4.1 Enumeration Type Documentation

0.4.1.1 Direction

```
enum BeeGame.Core.Enums.Direction  [strong]
```

Direction in the game

Enumerator

NORTH	
EAST	
SOUTH	
WEST	
UP	
DOWN	

Definition at line 6 of file Enums.cs.

```
{
    NORTH, EAST, SOUTH, WEST, UP, DOWN
};
```

0.5 BeeGame.Inventory Namespace Reference

Namespaces

- namespace Player_Inventory

Classes

- class Inventory

  Base class for all inventorys in the game
- class InventorySlot
- class ItemsInInventory

  Class that holds all of the items in the inventory. Can be serialized so inventory may be saved

0.6 BeeGame.Inventory.Player_Inventory Namespace Reference

Classes

- class PlayerInventory

  Controlls the player inventory

0.7 BeeGame.Items Namespace Reference

Classes

- class Item

  Base class for all Items and Blocks in the game
- class ItemGameObject

  Interface between item and inity gameobjects
- struct Tile

  Position of the items texture

0.8 BeeGame.Player Namespace Reference

Classes

- class PlayerLook

  The look for the player
- class PlayerMove

  Moves the player
- class Selector

  Moves the Block selector

0.9 BeeGame.Resources Namespace Reference

Classes

- class Resources

  A strongly-typed resource class, for looking up localized strings, etc.

0.10 BeeGame.Serialization Namespace Reference

Classes

- class Serialization

  Serializes and Deserialises things

0.11 BeeGame.Terrain Namespace Reference

Namespaces

- namespace Chunks
- namespace LandGeneration

Classes

- struct ChunkWorldPos

  Serializable int version of THVector3

0.12 BeeGame.Terrain.Chunks Namespace Reference

Classes

- class Chunk

  A section of land for the game, used so that land can be generated in parts and not all at once
- class LoadChunks

  Loads the Chunks around the player
- class MeshData

  The data for a Chunks's Mesh
- class SaveChunk

  Saves a Chunks modified Blocks for save optimisation

0.13 BeeGame.Terrain.LandGeneration Namespace Reference

Namespaces

- namespace Noise

Classes

- class Terrain

  Should use as an interface between the rest of the game and the terrain
- class TerrainGeneration

  Generates the terrain for the game
- class World

  Allows inter Chunk communication as it stores a list of active chunks

0.14 BeeGame.Terrain.LandGeneration.Noise Namespace Reference

Classes

- class SimplexNoise

  Implementation of the Perlin simplex noise, an improved Perlin noise algorithm. Based loosely on SimplexNoise1234 by Stefan Gustavson <http://∗staffwww.itn.liu.se/∼stegu/aqsis/aqsis-newnoise/>

Part II

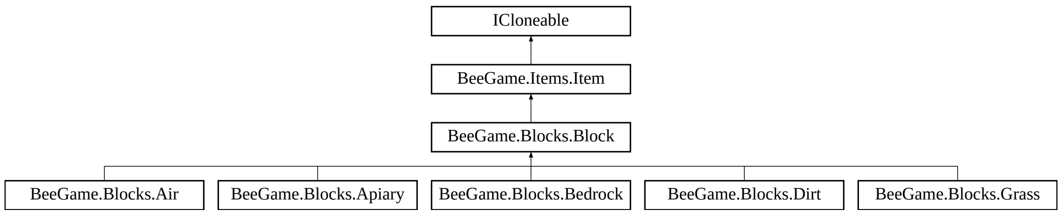
Class Documentation

1 Items

1.1 BeeGame.Items.Item Class Reference

Base class for all Items and Blocks in the game

Inheritance diagram for BeeGame.Items.Item:



Public Member Functions

- Item ()
- Item (string name)
- virtual GameObject GetGameObject ()

  Returns the GameObject for the item of it has one
- virtual string GetItemID ()

  Returns the id for the item as a string
- virtual Sprite GetItemSprite ()

  Returns the sprite for the item
- virtual string GetItemName ()
- virtual Tile TexturePosition (Direction direction)

  Texture postion of the items texture
- virtual MeshData ItemMesh (int x, int y, int z, MeshData meshData)

  Returns the mesh for the item
- virtual Vector2 [ ] FaceUVs (Direction direction)

  Sets the UVs for the given Direction
- object Clone ()

  Slow try no to use. Instead use Extensions.CloneObject<T>(T)
- override string ToString ()

  Returns the item name an id formatted nicely
- override int GetHashCode ()

  Returns the hashcode for the item
- override bool Equals (object obj)

  Checks if the item is equal to another

Static Public Member Functions

- static bool operator== (Item a, Item b)

  Overides the default == operator as different things need to be checked
- static bool operator!= (Item a, Item b)

  Inverse of ==

Public Attributes

- bool placeable = false

  Is this item placeable. Saves checking if the item is a block type
- bool usesGameObject = false

  Does the item use a gameobject
- int itemStackCount = 1

  Number of items in the stack
- int maxStackCount = 64

  Max number of items in a stack

Protected Member Functions

- virtual MeshData FaceDataUp (int x, int y, int z, MeshData meshData, bool addToRenderMesh=true, float blockSize=0.5f)

  Adds the Upwards face to the given MeshData
- virtual MeshData FaceDataDown (int x, int y, int z, MeshData meshData, bool addToRenderMesh=true, float blockSize=0.5f)

  Adds the Bottom face to the given MeshData
- virtual MeshData FaceDataNorth (int x, int y, int z, MeshData meshData, bool addToRenderMesh=true, float blockSize=0.5f)

  Adds the North face to the given MeshData
- virtual MeshData FaceDataEast (int x, int y, int z, MeshData meshData, bool addToRenderMesh=true, float blockSize=0.5f)

  Adds the East face to the given MeshData
- virtual MeshData FaceDataSouth (int x, int y, int z, MeshData meshData, bool addToRenderMesh=true, float blockSize=0.5f)

  Adds the South face to the given MeshData
- virtual MeshData FaceDataWest (int x, int y, int z, MeshData meshData, bool addToRenderMesh=true, float blockSize=0.5f)

  Adds the West face to the given MeshData

Package Attributes

- string itemName = "Test Item"

  Name of the item

Private Attributes

- const float tileSize = 0.1f

  How big are the texture tiles in the texture map (1/tile number x)

1.1.1 Detailed Description

Base class for all Items and Blocks in the game

Definition at line 15 of file Item.cs.

1.1.2 Constructor & Destructor Documentation

1.1.2.1 Item() [1/2]

```
BeeGame.Items.Item.Item ( )
```

Definition at line 46 of file Item.cs.

```
        {
            itemName = "TestItem";
        }
```

1.1.2.2 Item() [2/2]

```
BeeGame.Items.Item.Item (
            string name )
```

Definition at line 51 of file Item.cs.

```
        {
            itemName = name;
        }
```

1.1.3 Member Function Documentation

1.1.3.1 Clone()

```
object BeeGame.Items.Item.Clone ( )
```

Slow try no to use. Instead use Extensions.CloneObject<T>(T)

Returns

A deep copy of this

Definition at line 314 of file Item.cs.

```
        {
            //Saves this to a file then reads it back so that a copy and not a reference is passed
            BinaryFormatter bf = new BinaryFormatter();
            MemoryStream ms = new MemoryStream();

            bf.Serialize(ms, this);
            ms.Seek(0, SeekOrigin.Begin);

            return bf.Deserialize(ms);
        }
```

1.1.3.2 Equals()

```
override bool BeeGame.Items.Item.Equals (
            object obj )
```

Checks if the item is equal to another

Parameters

obj	object to check against

Returns

true if items are the same

Definition at line 351 of file Item.cs.

```
        {
            if (!(obj is Item))
                return false;

            return this == (obj as Item);
        }
```

1.1.3.3 FaceDataDown()

```
virtual MeshData BeeGame.Items.Item.FaceDataDown (
            int x,
            int y,
            int z,
            MeshData meshData,
            bool addToRenderMesh = true,
            float blockSize = 0.5f )  [protected], [virtual]
```

Adds the Bottom face to the given MeshData

Parameters

x	X pos of the item
y	Y pos of the item
z	Z pos of the item
meshData	MeshData to add the face to
addToRenderMesh	Should the mesh be added to the render mesh (default true)
blockSize	how big is the item

Returns

Given MeshData with the face data added

Definition at line 178 of file Item.cs.

```
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z -
 blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z -
 blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z +
 blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z +
blockSize), addToRenderMesh);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.DOWN));

            return meshData;
        }
```

1.1.3.4 FaceDataEast()

```
virtual MeshData BeeGame.Items.Item.FaceDataEast (
              int x,
              int y,
              int z,
              MeshData meshData,
              bool addToRenderMesh = true,
              float blockSize = 0.5f )  [protected], [virtual]
```

Adds the East face to the given MeshData

Parameters

x	X pos of the item
y	Y pos of the item
z	Z pos of the item
meshData	MeshData to add the face to
addToRenderMesh	Should the mesh be added to the render mesh (default true)
blockSize	how big is the item

Returns

Given MeshData with the face data added

Definition at line 234 of file Item.cs.

```
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z + blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z + blockSize), addToRenderMesh);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.EAST));

            return meshData;
        }
```

1.1.3.5 FaceDataNorth()

```
virtual MeshData BeeGame.Items.Item.FaceDataNorth (
                int x,
                int y,
                int z,
                MeshData meshData,
                bool addToRenderMesh = true,
                float blockSize = 0.5f )  [protected], [virtual]
```

Adds the North face to the given MeshData

Parameters

x	X pos of the item
y	Y pos of the item
z	Z pos of the item
meshData	MeshData to add the face to
addToRenderMesh	Should the mesh be added to the render mesh (default true)
blockSize	how big is the item

Returns

Given MeshData with the face data added

Definition at line 206 of file Item.cs.

```
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z +
      blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z +
      blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z +
      blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z +
      blockSize), addToRenderMesh);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.NORTH));

            return meshData;
        }
```

1.1.3.6 FaceDataSouth()

```
virtual MeshData BeeGame.Items.Item.FaceDataSouth (
                int x,
                int y,
                int z,
                MeshData meshData,
                bool addToRenderMesh = true,
                float blockSize = 0.5f )  [protected], [virtual]
```

Adds the South face to the given MeshData

Parameters

x	X pos of the item
y	Y pos of the item
z	Z pos of the item
meshData	MeshData to add the face to
addToRenderMesh	Should the mesh be added to the render mesh (default true)
blockSize	how big is the item

Returns

Given MeshData with the face data added

Definition at line 262 of file Item.cs.

```
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z -
blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z -
blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z -
blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z -
blockSize), addToRenderMesh);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.SOUTH));

            return meshData;
        }
```

1.1.3.7 FaceDataUp()

```
virtual MeshData BeeGame.Items.Item.FaceDataUp (
              int x,
              int y,
              int z,
              MeshData meshData,
              bool addToRenderMesh = true,
              float blockSize = 0.5f )  [protected], [virtual]
```

Adds the Upwards face to the given MeshData

Parameters

x	X pos of the item
y	Y pos of the item
z	Z pos of the item
meshData	MeshData to add the face to
addToRenderMesh	Should the mesh be added to the render mesh (default true)
blockSize	how big is the item

Returns

> Given MeshData with the face data added

Definition at line 150 of file Item.cs.

```
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z + blockSize), addToRenderMesh, Direction.UP);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z + blockSize), addToRenderMesh, Direction.UP);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z - blockSize), addToRenderMesh, Direction.UP);
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z - blockSize), addToRenderMesh, Direction.UP);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.UP));

            return meshData;
        }
```

1.1.3.8 FaceDataWest()

```
virtual MeshData BeeGame.Items.Item.FaceDataWest (
              int x,
              int y,
              int z,
              MeshData meshData,
              bool addToRenderMesh = true,
              float blockSize = 0.5f )  [protected], [virtual]
```

Adds the West face to the given MeshData

Parameters

x	X pos of the item
y	Y pos of the item
z	Z pos of the item
meshData	MeshData to add the face to
addToRenderMesh	Should the mesh be added to the render mesh (default true)
blockSize	how big is the item

Returns

> Given MeshData with the face data added

Definition at line 290 of file Item.cs.

```
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z + blockSize), addToRenderMesh);
```

```
00294             meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z +
      blockSize), addToRenderMesh);
00295             meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z -
      blockSize), addToRenderMesh);
00296             meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z -
      blockSize), addToRenderMesh);
00297
00298             //adds teh tirs for the quad
00299             meshData.AddQuadTriangles(addToRenderMesh);
00300
00301             //if the data should be added to the render mesh also add the uvs to the mesh
00302             if (addToRenderMesh)
00303                 meshData.uv.AddRange(FaceUVs(Direction.WEST));
00304
00305             return meshData;
00306         }
```

1.1.3.9 FaceUVs()

```
virtual Vector2 [] BeeGame.Items.Item.FaceUVs (
            Direction direction )  [virtual]
```

Sets the UVs for the given Direction

Parameters

direction	Direction to add the texture

Returns

Array of Vector2 to add to the UVsreturns>

Definition at line 125 of file Item.cs.

```
00126         {
00127             //only 4 uvs per face
00128             Vector2[] UVs = new Vector2[4];
00129             Tile tilePos = TexturePosition(direction);
00130
00131             //sets the UVs for each vertex
00132             UVs[0] = new THVector2(tileSize * tilePos.x +
      tileSize - 0.01f, tileSize * tilePos.y + 0.01f);
00133             UVs[1] = new THVector2(tileSize * tilePos.x +
      tileSize - 0.01f, tileSize * tilePos.y + tileSize - 0.01f);
00134             UVs[2] = new THVector2(tileSize * tilePos.x + 0.01f,
      tileSize * tilePos.y + tileSize - 0.01f);
00135             UVs[3] = new THVector2(tileSize * tilePos.x + 0.01f,
      tileSize * tilePos.y + 0.01f);
00136
00137             return UVs;
00138         }
```

1.1.3.10 GetGameObject()

```
virtual GameObject BeeGame.Items.Item.GetGameObject ( )  [virtual]
```

Returns the GameObject for the item of it has one

Returns

GameObject for the item

Definition at line 62 of file Item.cs.

```
00062 { return null; }
```

1.1.3.11 GetHashCode()

```
override int BeeGame.Items.Item.GetHashCode ( )
```

Returns the hashcode for the item

Returns

1

Definition at line 341 of file Item.cs.

```
        {
            return 1;
        }
```

1.1.3.12 GetItemID()

```
virtual string BeeGame.Items.Item.GetItemID ( )  [virtual]
```

Returns the id for the item as a string

Returns

Definition at line 68 of file Item.cs.

```
        {
            return $"{GetHashCode()}";
        }
```

1.1.3.13 GetItemName()

```
virtual string BeeGame.Items.Item.GetItemName ( )  [virtual]
```

Reimplemented in BeeGame.Blocks.Grass.

Definition at line 82 of file Item.cs.

```
        {
            return $"{itemName}";
        }
```

1.1.3.14 GetItemSprite()

```
virtual Sprite BeeGame.Items.Item.GetItemSprite ( )  [virtual]
```

Returns the sprite for the item

Returns

Sprite for this item

Definition at line 77 of file Item.cs.

```
        {
            return SpriteDictionary.GetSprite("TestSprite");
        }
```

1.1.3.15 ItemMesh()

```
virtual MeshData BeeGame.Items.Item.ItemMesh (
              int x,
              int y,
              int z,
              MeshData meshData )  [virtual]
```

Returns the mesh for the item

Parameters

x	X pos if the item
y	Y pos if the item
z	Z pos if the item
meshData	data to add the mesh to

Returns

given MeshData with the items mesh added

Definition at line 107 of file Item.cs.

```
        {
            //adds all faces of the item to the mesh as all faces could be seen at any time
            meshData = FaceDataUp(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataDown(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataNorth(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataEast(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataSouth(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataWest(x, y, z, meshData, true, 0.25f);

            return meshData;
        }
```

1.1.3.16 operator"!=()

```
static bool BeeGame.Items.Item.operator!= (
            Item a,
            Item b )  [static]
```

Inverse of ==

Parameters

a	Item
b	Item

Returns

True if *a* != *b*

Definition at line 384 of file Item.cs.

```
        {
            return !(a == b);
        }
```

1.1.3.17 operator==()

```
static bool BeeGame.Items.Item.operator== (
            Item a,
            Item b )  [static]
```

Overides the default == operator as different things need to be checked

Parameters

a	Item
b	Item

Returns

true if *a* == *b*

Definition at line 365 of file Item.cs.

```
        {
            if (ReferenceEquals(a, null) && ReferenceEquals(b, null))
                return true;
            if (ReferenceEquals(a, null) || ReferenceEquals(b, null))
                return false;

            if(a.GetItemID() == b.GetItemID())
                return true;

            return false;
        }
```

1.1.3.18 TexturePosition()

```
virtual Tile BeeGame.Items.Item.TexturePosition (
            Direction direction )  [virtual]
```

Texture postion of the items texture

Parameters

direction	Direction for the texture

Returns

Position of the texture

Reimplemented in BeeGame.Blocks.Bedrock, BeeGame.Blocks.Grass, and BeeGame.Blocks.Dirt.

Definition at line 94 of file Item.cs.

```
        {
            return new Tile() { x = 1, y = 9 };
        }
```

1.1.3.19 ToString()

```
override string BeeGame.Items.Item.ToString ( )
```

Returns the item name an id formatted nicely

Returns

Definition at line 332 of file Item.cs.

```
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
```

1.1.4 Member Data Documentation

1.1.4.1 itemName

```
string BeeGame.Items.Item.itemName = "Test Item"  [package]
```

Name of the item

Definition at line 21 of file Item.cs.

1.1.4.2 itemStackCount

```
int BeeGame.Items.Item.itemStackCount = 1
```

Number of items in the stack

Definition at line 38 of file Item.cs.

1.1.4.3 maxStackCount

```
int BeeGame.Items.Item.maxStackCount = 64
```

Max number of items in a stack

Definition at line 42 of file Item.cs.

1.1.4.4 placeable

```
bool BeeGame.Items.Item.placeable = false
```

Is this item placeable. Saves checking if the item is a block type

Definition at line 25 of file Item.cs.

1.1.4.5 tileSize

```
const float BeeGame.Items.Item.tileSize = 0.1f  [private]
```

How big are the texture tiles in the texture map (1/tile number x)

Definition at line 33 of file Item.cs.

1.1.4.6 usesGameObject

```
bool BeeGame.Items.Item.usesGameObject = false
```

Does the item use a gameobject

Definition at line 29 of file Item.cs.

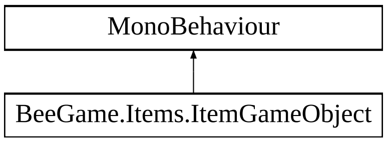
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Items/Item.cs

1.2 BeeGame.Items.ItemGameObject Class Reference

Interface between item and inity gameobjects

Inheritance diagram for BeeGame.Items.ItemGameObject:



Public Attributes

- Item item

  Item that this gameobject repersents
- GameObject go

  GameObject to make

Private Member Functions

- void Start ()

  Makes the mesh or instantiates the items gameobject
- void MakeMesh ()

  Makes the items mesh

1.2.1 Detailed Description

Interface between item and inity gameobjects

Definition at line 18 of file ItemGameObject.cs.

1.2.2 Member Function Documentation

1.2.2.1 MakeMesh()

`void BeeGame.Items.ItemGameObject.MakeMesh ( )  [private]`

Makes the items mesh

Definition at line 47 of file ItemGameObject.cs.

```
        {
            MeshData meshData = new MeshData();
            if(item != null)
                meshData = item.ItemMesh(0, 0, 0, meshData);

            Mesh mesh = new Mesh()
            {
                vertices = meshData.verts.ToArray(),
                triangles = meshData.tris.ToArray(),
                uv = meshData.uv.ToArray()
            };

            mesh.RecalculateNormals();

            GetComponent<MeshFilter>().mesh = mesh;
        }
```

1.2.2.2 Start()

```
void BeeGame.Items.ItemGameObject.Start ( )  [private]
```

Makes the mesh or instantiates the items gameobject

Definition at line 32 of file ItemGameObject.cs.

```
        {
            if (!item.usesGameObject)
                MakeMesh();

            if (item.usesGameObject)
            {
                GetComponent<BoxCollider>().enabled = false;
                Instantiate(item.GetGameObject(), transform, false);
            }
        }
```

1.2.3 Member Data Documentation

1.2.3.1 go

```
GameObject BeeGame.Items.ItemGameObject.go
```

GameObject to make

Definition at line 27 of file ItemGameObject.cs.

1.2.3.2 item

```
Item BeeGame.Items.ItemGameObject.item
```

Item that this gameobject repersents

Definition at line 23 of file ItemGameObject.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Items/ItemGameObject.cs

2 Blocks

2.1 BeeGame.Items.Tile Struct Reference

Position of the items texture

Public Attributes

- int x

    X pos of the texture
- int y

    Y pos of the texture

2.1.1 Detailed Description

Position of the items texture

Definition at line 395 of file Item.cs.

2.1.2 Member Data Documentation

2.1.2.1 x

```
int BeeGame.Items.Tile.x
```

X pos of the texture

Definition at line 400 of file Item.cs.

2.1.2.2 y

```
int BeeGame.Items.Tile.y
```

Y pos of the texture

Definition at line 404 of file Item.cs.

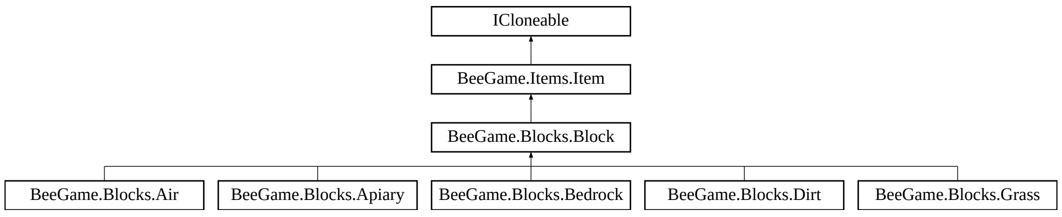
The documentation for this struct was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Items/Item.cs

2.2 BeeGame.Blocks.Block Class Reference

Base class for blocks

Inheritance diagram for BeeGame.Blocks.Block:



Public Member Functions

- Block ()
  Constructor sets the Item.placeable to true
- Block (string name)
- virtual void BreakBlock (THVector3 pos)
  Spawns an item with the same texture as the broken block
- virtual void UpdateBlock (int x, int y, int z, Chunk chunk)
  Should this Block be updated when the mesh is made
- virtual MeshData BlockData (Chunk chunk, int x, int y, int z, MeshData meshData, bool addToRender↵Mesh=true)
  The data that this block adds to the mesh
- virtual bool IsSolid (Direction direction)
  What Directions is this Block solid in
- override int GetHashCode ()
  Hascode for the Block
- override string ToString ()
  Returns the Block name and Id formatted nicely

Public Attributes

- bool breakable = true
  Can this Block be broken
- bool changed = true
  Has this block been placed by the player

Additional Inherited Members

2.2.1 Detailed Description

Base class for blocks

Definition at line 13 of file Block.cs.

2.2.2 Constructor & Destructor Documentation

2.2.2.1 Block() [1/2]

`BeeGame.Blocks.Block.Block ( )`

Constructor sets the Item.placeable to true

Definition at line 30 of file Block.cs.

```
                        : base()
        {
            itemName = "Stone";
            placeable = true;
        }
```

2.2.2.2 Block() [2/2]

```
BeeGame.Blocks.Block.Block (
              string name )
```

Definition at line 36 of file Block.cs.

```
                                     : base(name)
              {
                  placeable = true;
              }
```

2.2.3 Member Function Documentation

2.2.3.1 BlockData()

```
virtual MeshData BeeGame.Blocks.Block.BlockData (
              Chunk chunk,
              int x,
              int y,
              int z,
              MeshData meshData,
              bool addToRenderMesh = true )  [virtual]
```

The data that this block adds to the mesh

Parameters

chunk	Chunk the block is in
x	X pos of the block
y	Y pos of the block
z	Z pos of the block
meshData	meshdata to add to
addToRenderMesh	should the block also be added to the render mesh not just the collsion mesh

Returns

Given *meshData* with this blocks data added to it

If no data of either collider or render should be added override to return the givn mesh.
If only collsion data should be added override to say render mesh false.

Reimplemented in BeeGame.Blocks.Air.

Definition at line 78 of file Block.cs.

```
              {
                  //Adds the Top face of the block
                  if (!chunk.GetBlock(x, y + 1, z, false).IsSolid(Direction.DOWN))
                  {
                      meshData = FaceDataUp(x, y, z, meshData, addToRenderMesh);
                  }
```

```
00085
00086            //Adds the Bottom face of the block
00087            if (!chunk.GetBlock(x, y - 1, z, false).IsSolid(Direction.UP))
00088            {
00089                meshData = FaceDataDown(x, y, z, meshData, addToRenderMesh);
00090            }
00091
00092            //Adds the North face of the block
00093            if (!chunk.GetBlock(x, y, z + 1, false).IsSolid(Direction.SOUTH))
00094            {
00095                meshData = FaceDataNorth(x, y, z, meshData, addToRenderMesh);
00096            }
00097
00098            //Adds the South face of the block
00099            if (!chunk.GetBlock(x, y, z - 1, false).IsSolid(Direction.NORTH))
00100            {
00101                meshData = FaceDataSouth(x, y, z, meshData, addToRenderMesh);
00102            }
00103
00104            //Adds the East face of the block
00105            if (!chunk.GetBlock(x + 1, y, z, false).IsSolid(Direction.WEST))
00106            {
00107                meshData = FaceDataEast(x, y, z, meshData, addToRenderMesh);
00108            }
00109
00110            //Adds the West face of the block
00111            if (!chunk.GetBlock(x - 1, y, z, false).IsSolid(Direction.EAST))
00112            {
00113                meshData = FaceDataWest(x, y, z, meshData, addToRenderMesh);
00114            }
00115
00116            return meshData;
00117
00118        }
```

2.2.3.2 BreakBlock()

```
virtual void BeeGame.Blocks.Block.BreakBlock (
               THVector3 pos )   [virtual]
```

Spawns an item with the same texture as the broken block

Parameters

pos	position to spawn the Item

Reimplemented in BeeGame.Blocks.Bedrock, and BeeGame.Blocks.Air.

Definition at line 47 of file Block.cs.

```
00048        {
00049            GameObject go = Object.Instantiate(UnityEngine.Resources.Load("
      Prefabs/ItemGameObject") as GameObject, pos, Quaternion.identity) as GameObject;
00050            go.GetComponent<ItemGameObject>().item = this;
00051        }
```

2.2.3.3 GetHashCode()

```
override int BeeGame.Blocks.Block.GetHashCode ( )
```

Hascode for the Block

Returns

1

Definition at line 136 of file Block.cs.

```
        {
            return 1;
        }
```

2.2.3.4 IsSolid()

```
virtual bool BeeGame.Blocks.Block.IsSolid (
            Direction direction )  [virtual]
```

What Directions is this Block solid in

Parameters

direction	Direction to check

Returns

Default returns true for all sides

Reimplemented in BeeGame.Blocks.Air.

Definition at line 125 of file Block.cs.

```
        {
            return true;
        }
```

2.2.3.5 ToString()

```
override string BeeGame.Blocks.Block.ToString ( )
```

Returns the Block name and Id formatted nicely

Returns

Definition at line 145 of file Block.cs.

```
        {
            return $"{itemName} \nID: {GetHashCode()}";
        }
```

2.2.3.6 UpdateBlock()

```
virtual void BeeGame.Blocks.Block.UpdateBlock (
             int x,
             int y,
             int z,
             Chunk chunk )  [virtual]
```

Should this Block be updated when the mesh is made

Parameters

x	X pos if the block
y	Y pos of the block
z	Z pos of the block
chunk	Chunk that the block is in

Reimplemented in BeeGame.Blocks.Grass.

Definition at line 60 of file Block.cs.

```
00060 { }
```

2.2.4 Member Data Documentation

2.2.4.1 breakable

```
bool BeeGame.Blocks.Block.breakable = true
```

Can this Block be broken

Definition at line 19 of file Block.cs.

2.2.4.2 changed

```
bool BeeGame.Blocks.Block.changed = true
```

Has this block been placed by the player

Definition at line 23 of file Block.cs.

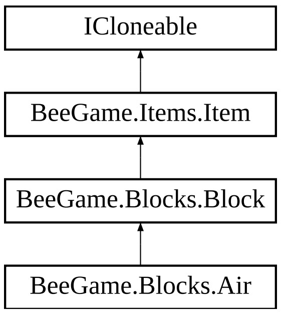
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Block.cs

2.3 BeeGame.Blocks.Air Class Reference

Air Block is an empty block that does not render and has no collider

Inheritance diagram for BeeGame.Blocks.Air:



Public Member Functions

- Air ()
- override void BreakBlock (THVector3 pos)

  No item should be made when air is broken
- override MeshData BlockData (Chunk chunk, int x, int y, int z, MeshData meshData, bool addRoRender↩ Mesh=true)

  Returns the given MeshData as Air does not add anything to the mesh
- override bool IsSolid (Direction direction)
- override int GetHashCode ()

  Hashcode acts as the base ID for an item
- override string ToString ()

  Gets the item name and ID in a nice format

Additional Inherited Members

2.3.1 Detailed Description

Air Block is an empty block that does not render and has no collider

Definition at line 12 of file Air.cs.

2.3.2 Constructor & Destructor Documentation

2.3.2.1 Air()

```
BeeGame.Blocks.Air.Air ( )
```

Definition at line 14 of file Air.cs.

```
00014                        : base("Air")
00015         {
00016         }
```

2.3.3 Member Function Documentation

2.3.3.1 BlockData()

```
override MeshData BeeGame.Blocks.Air.BlockData (
              Chunk chunk,
              int x,
              int y,
              int z,
              MeshData meshData,
              bool addRoRenderMesh = true )  [virtual]
```

Returns the given MeshData as Air does not add anything to the mesh

Returns

Given MeshData

Reimplemented from BeeGame.Blocks.Block.

Definition at line 31 of file Air.cs.

```
        {
            return meshData;
        }
```

2.3.3.2 BreakBlock()

```
override void BeeGame.Blocks.Air.BreakBlock (
              THVector3 pos )  [virtual]
```

No item should be made when air is broken

Parameters

pos	position to spawn the Item

Reimplemented from BeeGame.Blocks.Block.

Definition at line 22 of file Air.cs.

```
        {
            return;
        }
```

2.3.3.3 GetHashCode()

```
override int BeeGame.Blocks.Air.GetHashCode ( )
```

Hashcode acts as the base ID for an item

Returns

2

Definition at line 50 of file Air.cs.

```
        {
            return 2;
        }
```

2.3.3.4 IsSolid()

```
override bool BeeGame.Blocks.Air.IsSolid (
            Direction direction ) [virtual]
```

Parameters

direction	Direction wanted to chesk solid

Returns

false

Reimplemented from BeeGame.Blocks.Block.

Definition at line 41 of file Air.cs.

```
        {
            return false;
        }
```

2.3.3.5 ToString()

```
override string BeeGame.Blocks.Air.ToString ( )
```

Gets the item name and ID in a nice format

Returns

Definition at line 59 of file Air.cs.

```
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
```

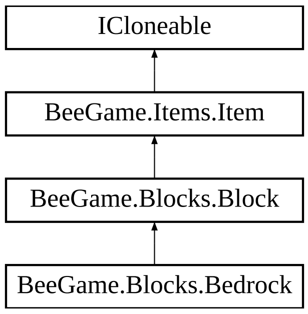
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Air.cs

2.4 BeeGame.Blocks.Bedrock Class Reference

Bedrock Block

Inheritance diagram for BeeGame.Blocks.Bedrock:



Public Member Functions

- Bedrock ()

  Constructor
- override void BreakBlock (THVector3 pos)

  The block cannot be broken so nothing is done
- override Tile TexturePosition (Direction direction)

  Position if te bedrock texture in the atlas
- override int GetHashCode ()

  Returns the ID of the item
- override string ToString ()

  The item name and ID as a string

Additional Inherited Members

2.4.1 Detailed Description

Bedrock Block

Definition at line 12 of file Bedrock.cs.

2.4.2 Constructor & Destructor Documentation

2.4.2.1 Bedrock()

```
BeeGame.Blocks.Bedrock.Bedrock ( )
```

Constructor

Definition at line 18 of file Bedrock.cs.

```
00018                          : base("Bedrock")
00019         {
00020             breakable = false;
00021         }
```

2.4.3 Member Function Documentation

2.4.3.1 BreakBlock()

```
override void BeeGame.Blocks.Bedrock.BreakBlock (
             THVector3 pos )  [virtual]
```

The block cannot be broken so nothing is done

Parameters

pos	positon of the block

Reimplemented from BeeGame.Blocks.Block.

Definition at line 29 of file Bedrock.cs.

```
        {
            return;
        }
```

2.4.3.2 GetHashCode()

```
override int BeeGame.Blocks.Bedrock.GetHashCode ( )
```

Returns the ID of the item

Returns

-1

Definition at line 52 of file Bedrock.cs.

```
        {
            return -1;
        }
```

2.4.3.3 TexturePosition()

```
override Tile BeeGame.Blocks.Bedrock.TexturePosition (
             Direction direction )  [virtual]
```

Position if te bedrock texture in the atlas

Parameters

direction	Direction

Returns

Position in the texture atlas

Reimplemented from BeeGame.Items.Item.

Definition at line 41 of file Bedrock.cs.

```
        {
            return new Tile() { x = 0, y = 0};
        }
```

2.4.3.4 ToString()

```
override string BeeGame.Blocks.Bedrock.ToString ( )
```

The item name and ID as a string

Returns

A nicely formatted string

Definition at line 61 of file Bedrock.cs.

```
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
```

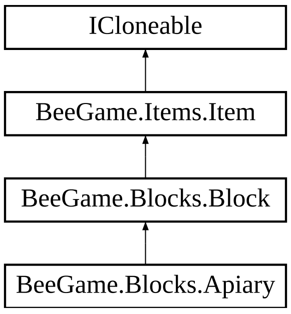
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Bedrock.cs

2.5 BeeGame.Blocks.Apiary Class Reference

Apiary Block

Inheritance diagram for BeeGame.Blocks.Apiary:



Public Member Functions

- Apiary ()

  Constructor
- Apiary (SerializationInfo info, StreamingContext context)
- override int GetHashCode ()

  ID of the item
- override string ToString ()

  The item name and ID as a string

Additional Inherited Members

2.5.1 Detailed Description

Apiary Block

Definition at line 8 of file Apiary.cs.

2.5.2 Constructor & Destructor Documentation

2.5.2.1 Apiary() [1/2]

```
BeeGame.Blocks.Apiary.Apiary ( )
```

Constructor

Definition at line 14 of file Apiary.cs.

```
                        : base("Apiary")
        {
        }
```

2.5.2.2 Apiary() [2/2]

```
BeeGame.Blocks.Apiary.Apiary (
            SerializationInfo info,
            StreamingContext context )
```

Definition at line 19 of file Apiary.cs.

```
        {
            //*use info.getvalue("valuename", typeof(valueType))
            UnityEngine.MonoBehaviour.print("hi");
        }
```

2.5.3 Member Function Documentation

2.5.3.1 GetHashCode()

```
override int BeeGame.Blocks.Apiary.GetHashCode ( )
```

ID of the item

Returns

3

Definition at line 30 of file Apiary.cs.

```
        {
            return 3;
        }
```

2.5.3.2 ToString()

```
override string BeeGame.Blocks.Apiary.ToString ( )
```

The item name and ID as a string

Returns

A nicely formatted string

Definition at line 39 of file Apiary.cs.

```
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
```

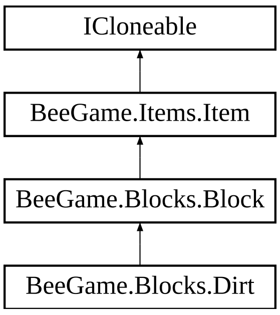
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Apiary.cs

2.6 BeeGame.Blocks.Dirt Class Reference

Dirt Block

Inheritance diagram for BeeGame.Blocks.Dirt:



Public Member Functions

- Dirt ()

  Constructor
- override Tile TexturePosition (Direction direction)

  Position of the dirt texture in the atlas
- override int GetHashCode ()

  Base ID of the block
- override string ToString ()

  Returns the name and ID of the block as a string

Additional Inherited Members

2.6.1 Detailed Description

Dirt Block

Definition at line 11 of file Dirt.cs.

2.6.2 Constructor & Destructor Documentation

2.6.2.1 Dirt()

```
BeeGame.Blocks.Dirt.Dirt ( )
```

Constructor

Definition at line 17 of file Dirt.cs.

```
00017 : base("Dirt"){}
```

2.6.3 Member Function Documentation

2.6.3.1 GetHashCode()

```
override int BeeGame.Blocks.Dirt.GetHashCode ( )
```

Base ID of the block

Returns

5

Definition at line 37 of file Dirt.cs.

```
00038         {
00039             return 5;
00040         }
```

2.6.3.2 TexturePosition()

```
override Tile BeeGame.Blocks.Dirt.TexturePosition (
            Direction direction ) [virtual]
```

Position of the dirt texture in the atlas

Parameters

direction	

Returns

Reimplemented from BeeGame.Items.Item.

Definition at line 26 of file Dirt.cs.

```
        {
            return new Tile { x = 2, y = 9 };
        }
```

2.6.3.3 ToString()

`override string BeeGame.Blocks.Dirt.ToString ( )`

Returns the name and ID of the block as a string

Returns

A nicely formatted string

Definition at line 46 of file Dirt.cs.

```
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
```

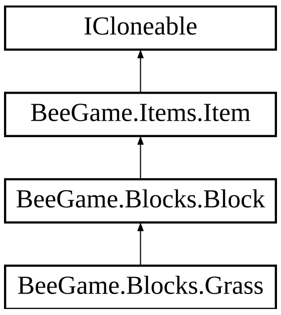
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Dirt.cs

2.7 BeeGame.Blocks.Grass Class Reference

Grass Block

Inheritance diagram for BeeGame.Blocks.Grass:



Public Member Functions

- Grass ()

  Constructor also sets teh items name
- override void UpdateBlock (int x, int y, int z, Chunk chunk)

  Will turn this Block into a Dirt block if another block is above it
- override Tile TexturePosition (Direction direction)

  Texture position of the Block face
- override string GetItemName ()
- override int GetHashCode ()

  The Base id for the block
- override string ToString ()

  REturns the name and value for the block as a string

Additional Inherited Members

2.7.1 Detailed Description

Grass Block

Definition at line 12 of file Grass.cs.

2.7.2 Constructor & Destructor Documentation

2.7.2.1 Grass()

```
BeeGame.Blocks.Grass.Grass ( )
```

Constructor also sets teh items name

Definition at line 18 of file Grass.cs.

```
00018 : base("Grass"){}
```

2.7.3 Member Function Documentation

2.7.3.1 GetHashCode()

```
override int BeeGame.Blocks.Grass.GetHashCode ( )
```

The Base id for the block

Returns

4

Definition at line 76 of file Grass.cs.

```
00077         {
00078             return 4;
00079         }
```

2.7.3.2 GetItemName()

```
override string BeeGame.Blocks.Grass.GetItemName ( )  [virtual]
```

Reimplemented from BeeGame.Items.Item.

Definition at line 67 of file Grass.cs.

```
        {
            return "Grass";
        }
```

2.7.3.3 TexturePosition()

```
override Tile BeeGame.Blocks.Grass.TexturePosition (
            Direction direction )  [virtual]
```

Texture position of the Block face

Parameters

direction	Direction of the block face

Returns

Texture positon as a Tile

Reimplemented from BeeGame.Items.Item.

Definition at line 40 of file Grass.cs.

```
        {
            //All textures are on the dame Y value for the texture atlas so Y can be set
            Tile tile = new Tile()
            {
                y = 9
            };

            switch (direction)
            {
                //if we want the top face return the full grass texture
                case Direction.UP:
                    tile.x = 3;
                    return tile;
                //if we want the bottom face return the dirt texture
                case Direction.DOWN:
                    tile.x = 2;
                    return tile;
                //return the 1/2 grass testure if a side face is wanted
                default:
                    tile.x = 4;
                    return tile;
            }
        }
```

2.7.3.4 ToString()

```
override string BeeGame.Blocks.Grass.ToString ( )
```

REturns the name and value for the block as a string

Returns

A nicely formatted string

Definition at line 85 of file Grass.cs.

```
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
```

2.7.3.5 UpdateBlock()

```
override void BeeGame.Blocks.Grass.UpdateBlock (
                int x,
                int y,
                int z,
                Chunk chunk )  [virtual]
```

Will turn this Block into a Dirt block if another block is above it

Parameters

x	X pos if the block
y	Y pos if the block
z	Z pos if the block
chunk	Chunk that this block is in

Reimplemented from BeeGame.Blocks.Block.

Definition at line 29 of file Grass.cs.

```
        {
            if (chunk.GetBlock(x, y + 1, z, false).IsSolid(Direction.DOWN))
                chunk.blocks[x, y, z] = new Dirt() { changed =
    changed };
        }
```

The documentation for this class was generated from the following file:

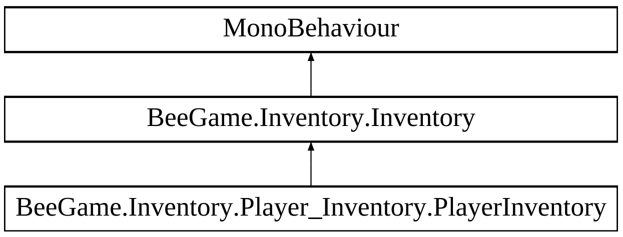
- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Grass.cs

3 Inventory

3.1 BeeGame.Inventory.Inventory Class Reference

Base class for all inventorys in the game

Inheritance diagram for BeeGame.Inventory.Inventory:


MonoBehaviour
BeeGame.Inventory.Inventory
BeeGame.Inventory.Player_Inventory.PlayerInventory

Public Member Functions

- bool InventorySet ()

  Is the inventory set?
- void SetInventorySize (int inventorySize)

  Sets the inventory soze to the number of slots in the invnetory
- void SetAllItems (ItemsInInventory items)

  Sets the items to the given ItemsInInventory
- void UpdateBase ()

  Things in the inventory that should be updated
- ItemsInInventory GetAllItems ()

  Gets all of the items in the invntory
- void AddItemToSlots (int slotIndex, Item item)

  Adds the given item to the inventory in the given slotIndex
- bool AddItemToInventory (Item item)

  Add an item to the inventory

Public Attributes

- InventorySlot [ ] slots

  Slots in the inventory
- string inventoryName = ""

  Name of this inventory

Package Attributes

- Item floatingItem

  Item that is currenty being moved

Private Member Functions

- void PutItemsInSlots ()

  Sets an Item in the ItemsInInventory.itemsInInventory array to a InventorySlot.item

Private Attributes

- ItemsInInventory items

  Items in the invemtory

3.1.1 Detailed Description

Base class for all inventorys in the game

Definition at line 9 of file Inventory.cs.

3.1.2 Member Function Documentation

3.1.2.1 AddItemToInventory()

```
bool BeeGame.Inventory.Inventory.AddItemToInventory (
             Item item )
```

Add an item to the inventory

Parameters

item	Item to add

Returns

true if item wasa added

Definition at line 116 of file Inventory.cs.

```
        {
            return items.AddItem(item);
        }
```

3.1.2.2 AddItemToSlots()

```
void BeeGame.Inventory.Inventory.AddItemToSlots (
             int slotIndex,
             Item item )
```

Adds the given *item* to the inventory in the given *slotIndex*

Parameters

slotIndex	Slot to add item to
item	Item to add

Definition at line 104 of file Inventory.cs.

```
        {
            items.AddItem(slotIndex, item);
            //* saves the inventory changes
            Serialization.Serialization.SerializeInventory(this, inventoryName);
        }
```

3.1.2.3 GetAllItems()

`ItemsInInventory BeeGame.Inventory.Inventory.GetAllItems ( )`

Gets all of the items in the invntory

Returns

All of the items in the inventory as ItemsInInventory

Definition at line 94 of file Inventory.cs.

```
        {
            return items;
        }
```

3.1.2.4 InventorySet()

`bool BeeGame.Inventory.Inventory.InventorySet ( )`

Is the inventory set?

Returns

true if items == null

Definition at line 35 of file Inventory.cs.

```
        {
            if (items == null)
                return true;

            return false;
        }
```

3.1.2.5 PutItemsInSlots()

`void BeeGame.Inventory.Inventory.PutItemsInSlots ( )  [private]`

Sets an Item in the ItemsInInventory.itemsInInventory array to a InventorySlot.item

Definition at line 79 of file Inventory.cs.

```
        {
            //* goes through all of the items in the array setting then all to a slot
            for (int i = 0; i < slots.Length; i++)
            {
                slots[i].slotIndex = i;
                slots[i].myInventory = this;
                slots[i].item = items.itemsInInventory[i];
            }
        }
```

3.1.2.6 SetAllItems()

```
void BeeGame.Inventory.Inventory.SetAllItems (
            ItemsInInventory items )
```

Sets the items to the given ItemsInInventory

Parameters

items	Items to set this inventory to

remarks> Used during deserialization to restor the inventory /remarks>

Definition at line 59 of file Inventory.cs.

```
        {
            this.items = items;
        }
```

3.1.2.7 SetInventorySize()

```
void BeeGame.Inventory.Inventory.SetInventorySize (
            int inventorySize )
```

Sets the inventory soze to the number of slots in the invnetory

Parameters

inventorySize	

Definition at line 47 of file Inventory.cs.

```
        {
            items = new ItemsInInventory(slots.Length);
        }
```

3.1.2.8 UpdateBase()

```
void BeeGame.Inventory.Inventory.UpdateBase ( )
```

Things in the inventory that should be updated

Definition at line 69 of file Inventory.cs.

```
        {
            PutItemsInSlots();
        }
```

3.1.3 Member Data Documentation

3.1.3.1 floatingItem

```
Item BeeGame.Inventory.Inventory.floatingItem  [package]
```

Item that is currenty being moved

Definition at line 23 of file Inventory.cs.

3.1.3.2 inventoryName

```
string BeeGame.Inventory.Inventory.inventoryName = ""
```

Name of this inventory

Definition at line 27 of file Inventory.cs.

3.1.3.3 items

```
ItemsInInventory BeeGame.Inventory.Inventory.items  [private]
```

Items in the invemtory

Definition at line 15 of file Inventory.cs.

3.1.3.4 slots

```
InventorySlot [] BeeGame.Inventory.Inventory.slots
```

Slots in the inventory

Definition at line 19 of file Inventory.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Inventory/Inventory.cs

3.2 BeeGame.Inventory.ItemsInInventory Class Reference

Class that holds all of the items in the inventory. Can be serialized so inventory may be saved

Public Member Functions

- ItemsInInventory (int numberOfInventorySlots)

  Sets the size of the inventory
- void AddItem (int index, Item item)

  Add an Item to a specific index in the inventory
- bool AddItem (Item item)

  Adds a Item to the inventory

Public Attributes

- Item [ ] itemsInInventory

  All of the items in the inventory

3.2.1 Detailed Description

Class that holds all of the items in the inventory. Can be serialized so inventory may be saved

Definition at line 10 of file ItemsInInventory.cs.

3.2.2 Constructor & Destructor Documentation

3.2.2.1 ItemsInInventory()

```
BeeGame.Inventory.ItemsInInventory.ItemsInInventory (
             int numberOfInventorySlots )
```

Sets the size of the inventory

Parameters

numberOfInventorySlots	

Definition at line 21 of file ItemsInInventory.cs.

```
00022         {
00023             itemsInInventory = new Item[numberOfInventorySlots];
00024         }
```

3.2.3 Member Function Documentation

3.2.3.1 AddItem() [1/2]

```
void BeeGame.Inventory.ItemsInInventory.AddItem (
             int index,
             Item item )
```

Add an Item to a specific index in the inventory

Parameters

index	Were to add the item
item	What Item to put in the inventory

Definition at line 31 of file ItemsInInventory.cs.

```
        {
            itemsInInventory[index] = item;
        }
```

3.2.3.2 AddItem() [2/2]

```
bool BeeGame.Inventory.ItemsInInventory.AddItem (
            Item item )
```

Adds a Item to the inventory

Parameters

item	Item to add

Returns

true if *item* was added to the inventory

Definition at line 41 of file ItemsInInventory.cs.

```
        {
            for (int i = 0; i < itemsInInventory.Length; i++)
            {
                if (itemsInInventory[i] == null)
                {
                    itemsInInventory[i] = item;
                    return true;
                }
                if (itemsInInventory[i] == item &&
      itemsInInventory[i].itemStackCount + 1 <= itemsInInventory[i].maxStackCount
      )
                {
                    itemsInInventory[i].itemStackCount++;
                    return true;
                }
            }

            return false;
        }
```

3.2.4 Member Data Documentation

3.2.4.1 itemsInInventory

```
Item [] BeeGame.Inventory.ItemsInInventory.itemsInInventory
```

All of the items in the inventory

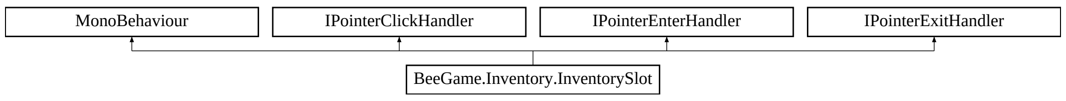
Definition at line 15 of file ItemsInInventory.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Inventory/ItemsInInventory.cs

3.3 BeeGame.Inventory.InventorySlot Class Reference

Inheritance diagram for BeeGame.Inventory.InventorySlot:



Public Member Functions

- void OnPointerClick (PointerEventData eventData)

  Allows the player to interact with the item slot
- void OnPointerEnter (PointerEventData eventData)

  Makes the text object when the cursor is over the slot
- void OnPointerExit (PointerEventData eventData)

  Destroys the text object when the cursor is not over the slot anymore

Public Attributes

- Item item

  The item this slot has in it
- Inventory myInventory

  The Inventory this slot is in
- GameObject itemText

  If the slot currently has the item text object made this will be not null otherwise it is null
- bool selectedSlot = false

  Is this slot currently the selected slot in the hotbar?

Package Attributes

- int slotIndex

  The slot in the inventory this is

Private Member Functions

- void Update ()

  Updates the slot
- void UpdateIcon ()

  Applies the correct icon to the slot depending on what is in the slot
- void AddToSlot (int numerToAdd)

  Adds a number to items into the slot
- void SplitStack ()

  Halfs a Item.itemStackCount between the slot and the Inventory.floatingItem
- void SwapItems ()

  Swaps the Item in the Inventory.floatingItem with the slots item
- void CheckFloatingItem ()

  Checks if the Inventory.floatingItem should be null
- void OnDisable ()

  Destroys the item text when the inventory is closed

3.3.1 Detailed Description

Definition at line 9 of file InventorySlot.cs.

3.3.2 Member Function Documentation

3.3.2.1 AddToSlot()

```
void BeeGame.Inventory.InventorySlot.AddToSlot (
              int numerToAdd )   [private]
```

Adds a number to items into the slot

Parameters

numerToAdd	Numebr or items to add to the slot

Definition at line 150 of file InventorySlot.cs.

```
        {
            //* if the item in the slot is null create it
            if (item == null)
            {
                item = myInventory.floatingItem.CloneObject();
                item.itemStackCount = 0;
            }

            //* add to number to add to the stack count
            item.itemStackCount += numerToAdd;

            //* if the stack count is now larger than it should be dont let it be
            if (item.itemStackCount > item.maxStackCount)
            {
                item.itemStackCount = item.maxStackCount;
            }

            //* remove the numebr if items form the floating item then check the floating item is not null
            myInventory.floatingItem.itemStackCount -= numerToAdd;
            CheckFloatingItem();
            //* save the inventory changes
            myInventory.AddItemToSlots(slotIndex,
      item);
        }
```

3.3.2.2 CheckFloatingItem()

```
void BeeGame.Inventory.InventorySlot.CheckFloatingItem ( )   [private]
```

Checks if the Inventory.floatingItem should be null

Definition at line 215 of file InventorySlot.cs.

```
        {
            if(myInventory.floatingItem.itemStackCount <= 0)
            {
                myInventory.floatingItem = null;
            }
        }
```

3.3.2.3 OnDisable()

`void BeeGame.Inventory.InventorySlot.OnDisable ( ) [private]`

Destroys the item text when the inventory is closed

Definition at line 254 of file InventorySlot.cs.

```
{
    Destroy(itemText);
}
```

3.3.2.4 OnPointerClick()

```
void BeeGame.Inventory.InventorySlot.OnPointerClick (
            PointerEventData eventData )
```

Allows the player to interact with the item slot

Parameters

eventData	Right or Left click

Called by the unity event handler when the slot is clicked on

Definition at line 75 of file InventorySlot.cs.

```
{
    if (myInventory.floatingItem != null)
    {
        //* Left click moves whole stacks if items
        if (eventData.button == PointerEventData.InputButton.Left)
        {
            //* If the item in the slot is empty put the floating item into it then clear it
            if (item == null)
            {
                item = myInventory.floatingItem;
                myInventory.floatingItem = null;
                myInventory.AddItemToSlots(slotIndex, item);
                return;
            }
            //* if the items are the same
            if(myInventory.floatingItem == item)
            {
                //* if the item in the inventoys stack count + the floating items stack count is less than the max stack count
                if (myInventory.floatingItem.itemStackCount + item.itemStackCount <= item.maxStackCount)
                {
                    AddToSlot(myInventory.floatingItem.itemStackCount);
                    return;
                }
                //* if the item stack added is larger than the max count add as many as you can and move on
                else
                {
                    AddToSlot(item.maxStackCount - item.itemStackCount);
                    return;
                }
            }
            //* If the items were not == swap them
```

```
                else
                {
                    SwapItems();
                    return;
                }
            }
            else if(eventData.button == PointerEventData.InputButton.Right)
            {
                //* if the item in slot is null add 1 from the floating item to it
                if(item == null)
                {
                    AddToSlot(1);
                    return;
                }
                //* if the items are the same add 1 from the floating item to this item
                else if(item == myInventory.floatingItem)
                {
                    AddToSlot(1);
                    return;
                }
            }
        }
        //* if the floating item is null
        else
        {
            //* add 1/2 of the stack into the floating item if right click was pressed
            if(eventData.button == PointerEventData.InputButton.Right)
            {
                SplitStack();
                return;
            }

            //* otherwie add the items into the floating item slot
            SwapItems();
            return;
        }

    }
```

3.3.2.5 OnPointerEnter()

```
void BeeGame.Inventory.InventorySlot.OnPointerEnter (
              PointerEventData eventData )
```

Makes the text object when the cursor is over the slot

Parameters

eventData	Not used but required for the interface

Definition at line 229 of file InventorySlot.cs.

```
    {
        //* if the item is null or the floating item has something in it dont display the item text as it is not necissary
        if (item != null && myInventory.floatingItem == null)
        {
            itemText = Instantiate(PrefabDictionary.GetPrefab("ItemDetails"));
            //* sets the text to the correct postion
            itemText.transform.GetChild(0).position = Input.mousePosition;
            //* puts the correct text in the box
            itemText.transform.GetChild(0).GetChild(0).GetComponent<Text>().text = $"{item.GetItemName()}\nStack: {item.itemStackCount}";
        }
    }
```

3.3.2.6 OnPointerExit()

```
void BeeGame.Inventory.InventorySlot.OnPointerExit (
            PointerEventData eventData )
```

Destroys the text object when the cursor is not over the slot anymore

Parameters

eventData	Not used but required for the interface

Definition at line 246 of file InventorySlot.cs.

```
        {
            Destroy(itemText);
        }
```

3.3.2.7 SplitStack()

```
void BeeGame.Inventory.InventorySlot.SplitStack ( )  [private]
```

Halfs a Item.itemStackCount between the slot and the Inventory.floatingItem

If the stack count is the slot is not an even number more items go to the floating item than go to the slot. This is so that right clicking on a slot when their is only 1 item in it actually make the item in that slot go into the floating item

Definition at line 181 of file InventorySlot.cs.

```
        {
            myInventory.floatingItem = item.CloneObject();
            int give = (item.itemStackCount + 1) / 2;
            myInventory.floatingItem.itemStackCount = give;
            item.itemStackCount -= give;

            if (item.itemStackCount <= 0)
                item = null;

            myInventory.AddItemToSlots(slotIndex,
     item);
            Destroy(itemText);
        }
```

3.3.2.8 SwapItems()

```
void BeeGame.Inventory.InventorySlot.SwapItems ( )  [private]
```

Swaps the Item in the Inventory.floatingItem with the slots item

Definition at line 198 of file InventorySlot.cs.

```
        {
            //* temp copy of the item
            Item temp = myInventory.floatingItem;
            //* sets the floating item
            myInventory.floatingItem = item;
            //* sets the item that was in the floating item to the item in the the slot
            item = temp;
            //* Saves the changes to the inventory
            myInventory.AddItemToSlots(slotIndex,
     item);
            //* destroys the text as it is not needed anymore
            Destroy(itemText);
        }
```

3.3.2.9 Update()

`void BeeGame.Inventory.InventorySlot.Update ( )  [private]`

Updates the slot

Definition at line 37 of file InventorySlot.cs.

```
        {
            UpdateIcon();
        }
```

3.3.2.10 UpdateIcon()

`void BeeGame.Inventory.InventorySlot.UpdateIcon ( )  [private]`

Applies the correct icon to the slot depending on what is in the slot

Definition at line 45 of file InventorySlot.cs.

```
        {
            if(item == null)
            {
                GetComponent<Image>().sprite = null;
            }
            else
            {
                GetComponent<Image>().sprite = item.GetItemSprite();
            }

            //* if the slot is selected in the hotbar give the player some indication by colouring it grey
            if (selectedSlot)
            {
                GetComponent<Image>().color = Color.gray;
            }
            else
            {
                GetComponent<Image>().color = Color.white;
            }
        }
```

3.3.3 Member Data Documentation

3.3.3.1 item

`Item BeeGame.Inventory.InventorySlot.item`

The item this slot has in it

Definition at line 19 of file InventorySlot.cs.

3.3.3.2 itemText

```
GameObject BeeGame.Inventory.InventorySlot.itemText
```

If the slot currently has the item text object made this will be not null otherwise it is null

Definition at line 27 of file InventorySlot.cs.

3.3.3.3 myInventory

```
Inventory BeeGame.Inventory.InventorySlot.myInventory
```

The Inventory this slot is in

Definition at line 23 of file InventorySlot.cs.

3.3.3.4 selectedSlot

```
bool BeeGame.Inventory.InventorySlot.selectedSlot = false
```

Is this slot currently the selected slot in the hotbar?

Definition at line 31 of file InventorySlot.cs.

3.3.3.5 slotIndex

```
int BeeGame.Inventory.InventorySlot.slotIndex  [package]
```

The slot in the inventory this is

Definition at line 15 of file InventorySlot.cs.

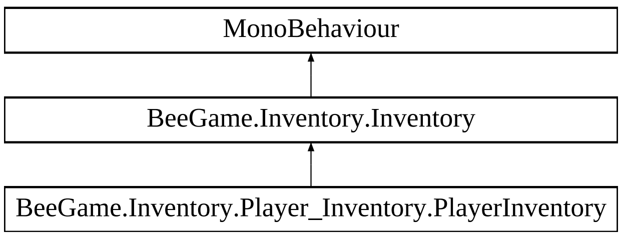
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Inventory/InventorySlot.cs

3.4 BeeGame.Inventory.Player_Inventory.PlayerInventory Class Reference

Controlls the player inventory

Inheritance diagram for BeeGame.Inventory.Player_Inventory.PlayerInventory:


MonoBehaviour
BeeGame.Inventory.Inventory
BeeGame.Inventory.Player_Inventory.PlayerInventory

Public Member Functions

- void SelectedSlot (int index)

  Updates the currrently selected hotbar slot
- bool GetItemFromHotBar (int slotIndex, out Item outItem)

  Gets an item from the hotbar (9 InventorySlots at the bottom of the screen)
- void RemoveItemFromInventory (int index)

  Removes 1 item from the given inventory index

Public Attributes

- GameObject playerInventory

  Object that the inventory is

Private Member Functions

- void Start ()

  Sets all requred params for the inventory and loads ant saved versions of it
- void SetPlayerInventory ()

  Set the size of the player inventory
- void Update ()

  Goves the inventory update ticks
- void OpenPlayerInventory ()

  Show/Hide the player inventory
- void PickupItem (ItemGameObject item)

  Pickup an item and put it into the Inventory

Additional Inherited Members

3.4.1 Detailed Description

Controlls the player inventory

Definition at line 10 of file PlayerInventory.cs.

3.4.2 Member Function Documentation

3.4.2.1 GetItemFromHotBar()

```
bool BeeGame.Inventory.Player_Inventory.PlayerInventory.GetItemFromHotBar (
             int slotIndex,
             out Item outItem )
```

Gets an item from the hotbar (9 InventorySlots at the bottom of the screen)

Parameters

slotIndex	Index to get Item from
outItem	Item in the slot

Returns

true if *outItem* is placeable, false if *outItem* is null or not placeable

Definition at line 83 of file PlayerInventory.cs.

```
        {
            //* get the item
            outItem = GetAllItems().itemsInInventory[slotIndex];

            if (outItem == null)
                return false;

            //* if the item is placebale and is not null remove 1 from the inventory as it is assumed it is
 about to be placed in the world
            if(outItem.placeable)
                RemoveItemFromInventory(slotIndex);

            return outItem.placeable;
        }
```

3.4.2.2 OpenPlayerInventory()

`void BeeGame.Inventory.Player_Inventory.PlayerInventory.OpenPlayerInventory ( )  [private]`

Show/Hide the player inventory

Definition at line 103 of file PlayerInventory.cs.

```
        {
            playerInventory.SetActive(!playerInventory.activeInHierarchy);
            THInput.isAnotherInventoryOpen = !
 THInput.isAnotherInventoryOpen;

            //* hides/ shows the mouse depending on if te inventory is open or not
            if (playerInventory.activeInHierarchy)
            {
                Cursor.lockState = CursorLockMode.None;
                Cursor.visible = true;
            }
            else
            {
                Cursor.visible = false;
                Cursor.lockState = CursorLockMode.Locked;
            }
        }
```

3.4.2.3 PickupItem()

```
void BeeGame.Inventory.Player_Inventory.PlayerInventory.PickupItem (
              ItemGameObject item )  [private]
```

Pickup an item and put it into the Inventory

Parameters

item	Item to try to put into the inventory

Definition at line 144 of file PlayerInventory.cs.

```
        {
            //* if the item can be added to the inventory do that
            if (AddItemToInventory(item.item))
            {
                //* if the item was added destroyits gameobject and save the inventory
                Destroy(item.gameObject);
                Serialization.Serialization.SerializeInventory(this,
    inventoryName);
            }
        }
```

3.4.2.4 RemoveItemFromInventory()

```
void BeeGame.Inventory.Player_Inventory.PlayerInventory.RemoveItemFromInventory (
            int index )
```

Removes 1 item from the given inventory index

Parameters

index	

Definition at line 125 of file PlayerInventory.cs.

```
        {
            //* if the item is already null nothign needs to be removed
            if (GetAllItems().itemsInInventory[index] != null)
            {
                //* remove 1 item and if that was the last in the stack remove the item from the inventory
                GetAllItems().itemsInInventory[index].
    itemStackCount -= 1;

                if (GetAllItems().itemsInInventory[index].itemStackCount <= 0)
                    GetAllItems().itemsInInventory[index] = null;

                Serialization.Serialization.SerializeInventory(this,
    inventoryName);
            }
        }
```

3.4.2.5 SelectedSlot()

```
void BeeGame.Inventory.Player_Inventory.PlayerInventory.SelectedSlot (
            int index )
```

Updates the currrently selected hotbar slot

Parameters

index	Slot that is selected

Definition at line 67 of file PlayerInventory.cs.

```
        {
            for (int i = 0; i < slots.Length; i++)
            {
                slots[i].selectedSlot = false;
            }

            slots[index].selectedSlot = true;
        }
```

3.4.2.6 SetPlayerInventory()

`void BeeGame.Inventory.Player_Inventory.PlayerInventory.SetPlayerInventory ( ) [private]`

Set the size of the player inventory

Definition at line 33 of file PlayerInventory.cs.

```
        {
            if (InventorySet())
                SetInventorySize(20);
        }
```

3.4.2.7 Start()

`void BeeGame.Inventory.Player_Inventory.PlayerInventory.Start ( ) [private]`

Sets all requred params for the inventory and loads ant saved versions of it

Definition at line 23 of file PlayerInventory.cs.

```
        {
            SetPlayerInventory();
            inventoryName = "PlayerInventory";
            Serialization.Serialization.DeSerializeInventory(this, inventoryName);
        }
```

3.4.2.8 Update()

`void BeeGame.Inventory.Player_Inventory.PlayerInventory.Update ( )  [private]`

Goves the inventory update ticks

Definition at line 43 of file PlayerInventory.cs.

```
        {
            UpdateBase();

            //* whecks if the inventory should be opened/closed
            if (THInput.GetButtonDown("Player Inventory"))
                OpenPlayerInventory();

            //* checks if somethig shoul dbe picked up and put into the inventory
            RaycastHit[] hit = Physics.SphereCastAll(transform.position, 1f, transform.forward);

            for (int i = hit.Length - 1; i >= 0; i--)
            {
                if (hit[i].collider.GetComponent<ItemGameObject>())
                    PickupItem(hit[i].collider.GetComponent<
    ItemGameObject>());
            }

        }
```

3.4.3 Member Data Documentation

3.4.3.1 playerInventory

`GameObject BeeGame.Inventory.Player_Inventory.PlayerInventory.playerInventory`

Object that the inventory is

Definition at line 16 of file PlayerInventory.cs.

The documentation for this class was generated from the following file:

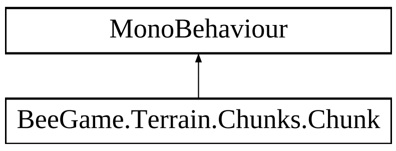
- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Inventory/Player Inventory/PlayerInventory.cs

4 Chunk

4.1 BeeGame.Terrain.Chunks.Chunk Class Reference

A section of land for the game, used so that land can be generated in parts and not all at once

Inheritance diagram for BeeGame.Terrain.Chunks.Chunk:



Public Member Functions

- Block GetBlock (int x, int y, int z, bool checkNebouringChunks=true)

    Returns the Block in the given x, y, z
- void SetBlock (int x, int y, int z, Block block)

    Sets a Block in the given position
- void SetBlocksUnmodified ()

    Sets all of the Blocks in the blocks array to unmodifed so that the whole chunk is not saved when it does not need to be

Static Public Member Functions

- static bool InRange (int i)

    Checks that a given value is within the Chunk

Public Attributes

- Block [,,] blocks = new Block[chunkSize, chunkSize, chunkSize]

    All of the Blocks in the Chunk
- bool update = true

    Should the Chunk be updated?
- bool rendered

    Is the Chunk rendered?
- bool updateCollsionMesh = false

    Should the chunks collision mesh be updated?
- bool applyCollisionMesh = false

    Should the collision mesh be applied
- World world

    World that this chunk is in as MonoBehaviours cannot be static this is for convenicence
- ChunkWorldPos chunkWorldPos

    Chunks position in the world as a ChunkWorldPos (int verson of Core.THVector3)

Static Public Attributes

- static int chunkSize = 16

    Size of the Chunk

Private Member Functions

- void Start ()

    Sets the meshCollider and filter variables
- void Update ()

    Checks if the Chunk should be updated
- void UpdateChunk ()

    Updates the mesh for the Chunk
- void RenderMesh (MeshData meshData)

    Renders the given MeshData into a unity Mesh
- void ColliderMesh ()

    Makes a collision mesh from the mesh

Private Attributes

- MeshData mesh = new MeshData()

    MeshData of this chunk
- MeshFilter filter

    This Chunks mesh filter
- MeshCollider meshCollider

    This Chunks mesh colldier

4.1.1 Detailed Description

A section of land for the game, used so that land can be generated in parts and not all at once

Definition at line 14 of file Chunk.cs.

4.1.2 Member Function Documentation

4.1.2.1 ColliderMesh()

```
void BeeGame.Terrain.Chunks.Chunk.ColliderMesh ( )  [private]
```

Makes a collision mesh from the mesh

Definition at line 234 of file Chunk.cs.

```
        {
            //if the chunk has been told to update the collsions but the chunk has ne verts dont do it as
their is no point
            if (this.mesh.verts.Count == 0)
                return;

            //if the render and collision meshes should be shared set the render mesh to the collision mesh
otherwise make a collision mesh
            if (this.mesh.shareMeshes)
            {
                world.chunkHasMadeCollisionMesh = true;
                applyCollisionMesh = false;
                meshCollider.sharedMesh = filter.mesh;
                return;
            }

            world.chunkHasMadeCollisionMesh = true;
            //Applying the mesh takes the longest but nothing can be dont with the mesh class in a
secondary thread...thanks Unity

            //makes a new mesh setting the name for convenience
            Mesh mesh = new Mesh()
            {
                name = "Collider Mesh",
                vertices = this.mesh.colVerts.ToArray(),
                triangles = this.mesh.colTris.ToArray()
            };

            //recalcs the normals and applies the mesh
            mesh.RecalculateNormals();

            meshCollider.sharedMesh = mesh;

            applyCollisionMesh = false;
        }
```

4.1.2.2 GetBlock()

```
Block BeeGame.Terrain.Chunks.Chunk.GetBlock (
            int x,
            int y,
            int z,
            bool checkNebouringChunks = true )
```

Returns the Block in the given x, y, z

Parameters

x	X pos if the Block
y	Z pos if the Block
z	Y pos if the Block
checkNebouringChunks	Shoud this check nebouring chunks? Only set to false when chunk mesh is being built for performance

Returns

Block at given x, y, z

Definition at line 123 of file Chunk.cs.

```
        {
            //checks that block is in the chunk
            if (InRange(x) && InRange(y) && InRange(z))
                return blocks[x, y, z];

            //if the block is not in the chunk and we should check other chunks do that, otherwise return
 an air block (empty block)
            if(checkNebouringChunks)
                return world.GetBlock(chunkWorldPos.x + x,
      chunkWorldPos.y + y, chunkWorldPos.z + z);

            return new Air();
        }
```

4.1.2.3 InRange()

```
static bool BeeGame.Terrain.Chunks.Chunk.InRange (
            int i )  [static]
```

Checks that a given value is within the Chunk

Parameters

i	Value to check

Returns

true if the value is in the Chunk

Definition at line 160 of file Chunk.cs.

```
        {
            //if the value is less then 0 or greater than 16 the value is outside the chunk
            if (i < 0 || i >= chunkSize)
                return false;
            return true;
        }
```

4.1.2.4 RenderMesh()

```
void BeeGame.Terrain.Chunks.Chunk.RenderMesh (
            MeshData meshData )  [private]
```

Renders the given MeshData into a unity Mesh

Parameters

meshData	Mesh data to render

Definition at line 211 of file Chunk.cs.

```
        {
            //Applying the mesh takes the longest but nothing can be dont with the mesh class in a
    secondary thread...thanks unity

            mesh.done = false;
            //clears the current chunk mesh
            filter.mesh.Clear();
            //name for convenience
            filter.mesh.name = "Render Mesh";
            //puts the tris and verts from the meshdata into the chunk mesh
            filter.mesh.vertices = meshData.verts.ToArray();
            filter.mesh.triangles = meshData.tris.ToArray();

            //sets the uvs
            filter.mesh.uv = meshData.uv.ToArray();

            //redoes the normals incase they got messed up
            filter.mesh.RecalculateNormals();
        }
```

4.1.2.5 SetBlock()

```
void BeeGame.Terrain.Chunks.Chunk.SetBlock (
            int x,
            int y,
            int z,
            Block block )
```

Sets a Block in the given position

Parameters

x	X pos of the Block
y	Y pos of the Block
z	Z pos of the Block
block	Block to set

Definition at line 143 of file Chunk.cs.

```
        {
            //sets the block in the position if it is in the chunk, then return early
            if (InRange(x) && InRange(y) && InRange(z))
            {
                blocks[x, y, z] = block;
                return;
            }
            //if the block is not in the chunk find its chunk and set it their
            world.SetBlock(chunkWorldPos.x + x,
    chunkWorldPos.y + y, chunkWorldPos.z + z, block);
        }
```

4.1.2.6 SetBlocksUnmodified()

`void BeeGame.Terrain.Chunks.Chunk.SetBlocksUnmodified ( )`

Sets all of the Blocks in the blocks array to unmodifed so that the whole chunk is not saved when it does not need to be

A modifed Block is a Block removed or added by the player

Definition at line 176 of file Chunk.cs.

```
        {
            foreach (var block in blocks)
            {
                block.changed = false;
            }
        }
```

4.1.2.7 Start()

`void BeeGame.Terrain.Chunks.Chunk.Start ( )  [private]`

Sets the meshCollider and filter variables

Definition at line 77 of file Chunk.cs.

```
        {
            filter = GetComponent<MeshFilter>();
            meshCollider = GetComponent<MeshCollider>();
        }
```

4.1.2.8 Update()

`void BeeGame.Terrain.Chunks.Chunk.Update ( )  [private]`

Checks if the Chunk should be updated

Definition at line 86 of file Chunk.cs.

```
        {
            lock(mesh)
            {
                if (update)
                {
                    update = false;
                    updateCollsionMesh = true;
                    mesh = new MeshData();
                    //Enabling threading here works in editor but not in build?
                    //ok whatever...
                    //Thread thread = new Thread(UpdateChunk);

                    //thread.Start();
                    UpdateChunk();
                }

                if (mesh.done && mesh != new MeshData())
                {
                    RenderMesh(mesh);
                }

                if (applyCollisionMesh)
                    ColliderMesh();
            }
        }
```

4.1.2.9 UpdateChunk()

`void BeeGame.Terrain.Chunks.Chunk.UpdateChunk ( )  [private]`

Updates the mesh for the Chunk

Definition at line 187 of file Chunk.cs.

```
        {
            //says that this chunk is rendered and initialtes the mesh
            rendered = true;

            //goes through every block in the blocks array getting their mesh data
            for (int x = 0; x < chunkSize; x ++)
            {
                for (int z = 0; z < chunkSize; z ++)
                {
                    for (int y = 0; y < chunkSize; y ++)
                    {
                        blocks[x, y, z].UpdateBlock(x, y, z, this);
                        mesh = blocks[x, y, z].BlockData(this, x, y, z, mesh);
                    }
                }
            }
            mesh.done = true;
        }
```

4.1.3 Member Data Documentation

4.1.3.1 applyCollisionMesh

```
bool BeeGame.Terrain.Chunks.Chunk.applyCollisionMesh = false
```

Should the collision mesh be applied

Definition at line 47 of file Chunk.cs.

4.1.3.2 blocks

```
Block [,,] BeeGame.Terrain.Chunks.Chunk.blocks = new Block[chunkSize, chunkSize, chunkSize]
```

All of the Blocks in the Chunk

Definition at line 29 of file Chunk.cs.

4.1.3.3 chunkSize

```
int BeeGame.Terrain.Chunks.Chunk.chunkSize = 16  [static]
```

Size of the Chunk

Same size for x, y, z
Posibly some place has 16 hard coded as reduceing the number breaks things TODO: find

Definition at line 24 of file Chunk.cs.

4.1.3.4 chunkWorldPos

```
ChunkWorldPos BeeGame.Terrain.Chunks.Chunk.chunkWorldPos
```

Chunks position in the world as a ChunkWorldPos (int verson of Core.THVector3)

Definition at line 56 of file Chunk.cs.

4.1.3.5 filter

```
MeshFilter BeeGame.Terrain.Chunks.Chunk.filter  [private]
```

This Chunks mesh filter

Definition at line 66 of file Chunk.cs.

4.1.3.6 mesh

```
MeshData BeeGame.Terrain.Chunks.Chunk.mesh = new MeshData()  [private]
```

MeshData of this chunk

Definition at line 61 of file Chunk.cs.

4.1.3.7 meshCollider

```
MeshCollider BeeGame.Terrain.Chunks.Chunk.meshCollider  [private]
```

This Chunks mesh colldier

Definition at line 70 of file Chunk.cs.

4.1.3.8 rendered

```
bool BeeGame.Terrain.Chunks.Chunk.rendered
```

Is the Chunk rendered?

Definition at line 38 of file Chunk.cs.

4.1.3.9 update

```
bool BeeGame.Terrain.Chunks.Chunk.update = true
```

Should the Chunk be updated?

Definition at line 34 of file Chunk.cs.

4.1.3.10 updateCollsionMesh

```
bool BeeGame.Terrain.Chunks.Chunk.updateCollsionMesh = false
```

Should the chunks collision mesh be updated?

Definition at line 43 of file Chunk.cs.

4.1.3.11 world

`World BeeGame.Terrain.Chunks.Chunk.world`

World that this chunk is in as MonoBehaviours cannot be static this is for convenicence

Definition at line 52 of file Chunk.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/Chunks/Chunk.cs

4.2 BeeGame.Terrain.Chunks.MeshData Class Reference

The data for a Chunks's Mesh

Public Member Functions

- void AddQuadTriangles (bool addToRenderMesh=true)
  Adds 2 triangles to the triangle list
- void AddVertices (THVector3 pos, bool addToRenderMesh=true, Direction direction=Direction.DOWN)
  Adds vertices to the render and collision Meshes
- void AddTriangle (int tri)
  Adds a triangle to both the render and collidson meshes

Public Attributes

- List< Vector3 > verts = new List<Vector3>()
  Verticies for the Chunk render Mesh
- List< int > tris = new List<int>()
  Triangles for the Chunk render Mesh
- List< Vector2 > uv = new List<Vector2>()
  UV mapping for the Chunk render Mesh
- List< Vector3 > colVerts = new List<Vector3>()
  Vertices for the Chunk collider Mesh
- List< int > colTris = new List<int>()
  Triangles for the Chunk collider Mesh
- bool shareMeshes = true
  Should thic chunk share is collider and render Meshes
- bool done = false

4.2.1 Detailed Description

The data for a Chunks's Mesh

Definition at line 11 of file MeshData.cs.

4.2.2 Member Function Documentation

4.2.2.1 AddQuadTriangles()

```
void BeeGame.Terrain.Chunks.MeshData.AddQuadTriangles (
                bool addToRenderMesh = true )
```

Adds 2 triangles to the triangle list

Parameters

addToRenderMesh	Should the triangles be added to the render Mesh

Definition at line 46 of file MeshData.cs.

```
        {
            //*adds the triangles in an anticlockwise order

            if (addToRenderMesh)
            {
                tris.Add(verts.Count - 4);
                tris.Add(verts.Count - 3);
                tris.Add(verts.Count - 2);
                tris.Add(verts.Count - 4);
                tris.Add(verts.Count - 2);
                tris.Add(verts.Count - 1);
            }

            colTris.Add(colVerts.Count - 4);
            colTris.Add(colVerts.Count - 3);
            colTris.Add(colVerts.Count - 2);
            colTris.Add(colVerts.Count - 4);
            colTris.Add(colVerts.Count - 2);
            colTris.Add(colVerts.Count - 1);
        }
```

4.2.2.2 AddTriangle()

```
void BeeGame.Terrain.Chunks.MeshData.AddTriangle (
               int tri )
```

Adds a triangle to both the render and collidson meshes

Parameters

tri	triangle

not used anymore remove?

Definition at line 91 of file MeshData.cs.

```
        {
            tris.Add(tri);

            colTris.Add(tri - (verts.Count - colVerts.Count));
        }
```

4.2.2.3 AddVertices()

```
void BeeGame.Terrain.Chunks.MeshData.AddVertices (
               THVector3 pos,
               bool addToRenderMesh = true,
               Direction direction = Direction.DOWN )
```

Adds vertices to the render and collision Meshes

Parameters

pos	Position of the vertice
addToRenderMesh	Should the vertice be added to the render Mesh
direction	What face is this vertice on

Definition at line 74 of file MeshData.cs.

```
        {
            if (addToRenderMesh)
                verts.Add(pos);

            //*if the vertice is on the top face make its positon slightly smaller
            if(direction == Direction.UP)
                colVerts.Add(pos - new THVector3(0.01f, 0, 0.01f));
        }
```

4.2.3 Member Data Documentation

4.2.3.1 colTris

`List<int> BeeGame.Terrain.Chunks.MeshData.colTris = new List<int>()`

Triangles for the Chunk collider Mesh

Definition at line 33 of file MeshData.cs.

4.2.3.2 colVerts

`List<Vector3> BeeGame.Terrain.Chunks.MeshData.colVerts = new List<Vector3>()`

Vertices for the Chunk collider Mesh

Definition at line 29 of file MeshData.cs.

4.2.3.3 done

`bool BeeGame.Terrain.Chunks.MeshData.done = false`

Definition at line 40 of file MeshData.cs.

4.2.3.4 shareMeshes

`bool BeeGame.Terrain.Chunks.MeshData.shareMeshes = true`

Should thic chunk share is collider and render Meshes

Definition at line 38 of file MeshData.cs.

4.2.3.5 tris

```
List<int> BeeGame.Terrain.Chunks.MeshData.tris = new List<int>()
```

Triangles for the Chunk render Mesh

Definition at line 20 of file MeshData.cs.

4.2.3.6 uv

```
List<Vector2> BeeGame.Terrain.Chunks.MeshData.uv = new List<Vector2>()
```

UV mapping for the Chunk render Mesh

Definition at line 24 of file MeshData.cs.

4.2.3.7 verts

```
List<Vector3> BeeGame.Terrain.Chunks.MeshData.verts = new List<Vector3>()
```

Verticies for the Chunk render Mesh

Definition at line 16 of file MeshData.cs.

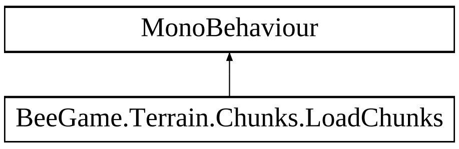
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/Chunks/MeshData.cs

4.3 BeeGame.Terrain.Chunks.LoadChunks Class Reference

Loads the Chunks around the player

Inheritance diagram for BeeGame.Terrain.Chunks.LoadChunks:



Public Attributes

- World world

  The world the player is in

Private Member Functions

- void Start ()

  Sets the world
- void Update ()

  Builds, Renders, and Remmoves Chunks
- void ApplyCollsionMeshToNearbyChunks ()

  Makes a collsion mesh for the Chunks nearest to the player to reduce lag created by PhysX mesh bakeing
- void LoadAndRenderChunks ()

  Gets the chunks that sould be built and renders then renders them
- void FindChunksToLoad ()

  Finds the Chunks that should be rendered
- void BuildChunk (ChunkWorldPos pos)

  Makes a chunk in the given positon if it does not already exist
- bool DeleteChunks ()

  Destroys Chunks every 10 calls

Private Attributes

- List< ChunkWorldPos > buildList = new List<ChunkWorldPos>()

  List if chunks to build

Static Private Attributes

- static ChunkWorldPos [ ] chunkPositions

  Positions to make chunks aroud the player ///
- static ChunkWorldPos [ ] nearbyChunks

  Chunks in a 3x3 radius around the player that should have a collision mesh
- static int timer = 0

  Timer for chunk removal

4.3.1 Detailed Description

Loads the Chunks around the player

Definition at line 11 of file LoadChunks.cs.

4.3.2 Member Function Documentation

4.3.2.1 ApplyCollsionMeshToNearbyChunks()

```
void BeeGame.Terrain.Chunks.LoadChunks.ApplyCollsionMeshToNearbyChunks ( )  [private]
```

Makes a collsion mesh for the Chunks nearest to the player to reduce lag created by PhysX mesh bakeing

We dont need to worry about removeing Chunk collision meshes as once PhysX has baked then they have minimal performance impact Doing things this wayt also spreads out the PhysX mesh bakeing

Definition at line 109 of file LoadChunks.cs.

```
        {
            //gets the player position in chunk coordinates
            ChunkWorldPos playerPos = new ChunkWorldPos(Mathf.FloorToInt(transform.position.x / Chunk.chunkSize) * Chunk.chunkSize, Mathf.FloorToInt(transform.position.y / Chunk.chunkSize) * Chunk.chunkSize, Mathf.FloorToInt(transform.position.z / Chunk.chunkSize) * Chunk.chunkSize);

            for (int i = 0; i < nearbyChunks.Length; i++)
            {
                ChunkWorldPos chunkPos = new ChunkWorldPos(nearbyChunks[i].x * Chunk.chunkSize + playerPos.x, 0, nearbyChunks[i].z * Chunk.chunkSize + playerPos.z);

                for (int j = -1; j < 2; j++)
                {
                    Chunk nearbyChunk = world.GetChunk(chunkPos.x, j * Chunk.chunkSize, chunkPos.z);

                    if (nearbyChunk != null)
                        nearbyChunk.applyCollisionMesh = true;
                }
            }
        }
```

4.3.2.2 BuildChunk()

```
void BeeGame.Terrain.Chunks.LoadChunks.BuildChunk (
            ChunkWorldPos pos )  [private]
```

Makes a chunk in the given positon if it does not already exist

Parameters

pos	hte positon of the new chunk

Definition at line 184 of file LoadChunks.cs.

```
        {
            if (world.GetChunk(pos.x, pos.y, pos.z) == null)
                world.CreateChunk(pos.x, pos.y, pos.z);
        }
```

4.3.2.3 DeleteChunks()

```
bool BeeGame.Terrain.Chunks.LoadChunks.DeleteChunks ( )  [private]
```

Destroys Chunks every 10 calls

Returns

true if Chunks were destroyed

Definition at line 194 of file LoadChunks.cs.

```
00195         {
00196             //destroys every 10 call to reduce load on CPU so that chunks are not destroyed and created at
     the same time
00197             if(timer == 10)
00198             {
00199                 timer = 0;
00200                 var chunksToDelete = new List<ChunkWorldPos>();
00201 
00202                 //go through all of the built chunks and if the chunk is 256 units away it is assumed to be
     out of sight so is added to the destroy list
00203                 foreach (var chunk in world.chunks)
00204                 {
00205                     float distance = Vector3.Distance(chunk.Value.transform.position, transform.position);
00206 
00207                     if (distance > 256)
00208                         chunksToDelete.Add(chunk.Key);
00209                 }
00210 
00211                 foreach (var chunk in chunksToDelete)
00212                 {
00213                     world.DestroyChunk(chunk.x, chunk.y, chunk.z);
00214                 }
00215 
00216                 return true;
00217             }
00218 
00219             timer++;
00220 
00221             return false;
00222         }
```

4.3.2.4 FindChunksToLoad()

`void BeeGame.Terrain.Chunks.LoadChunks.FindChunksToLoad ( )   [private]`

Finds the Chunks that should be rendered

Definition at line 148 of file LoadChunks.cs.

```
00149         {
00150             if (buildList.Count == 0)
00151             {
00152                 //gets the player position in chunk coordinates
00153                 ChunkWorldPos playerPos = new ChunkWorldPos(Mathf.FloorToInt(transform.position.x / Chunk.
    chunkSize) * Chunk.chunkSize, Mathf.FloorToInt(transform.position.y / Chunk.chunkSize) * Chunk.chunkSize,
    Mathf.FloorToInt(transform.position.z / Chunk.chunkSize) * Chunk.chunkSize);
00154 
00155                 //check all of the chunk positions and if that position does not have a chunk in it make it
00156                 for (int i = 0; i < chunkPositions.Length; i++)
00157                 {
00158                     ChunkWorldPos newChunkPos = new ChunkWorldPos(chunkPositions[i].x * Chunk
    .chunkSize + playerPos.x, 0, chunkPositions[i].z * Chunk.chunkSize + playerPos.z);
00159 
00160                     Chunk newChunk = world.GetChunk(newChunkPos.x, newChunkPos.y, newChunkPos.
    z);
00161 
00162                     if (newChunk != null && (newChunk.rendered || buildList.Contains(newChunkPos))
    )
00163                         continue;
00164 
00165                     for (int y = -1; y < 2; y++)
00166                     {
00167                         for (int x = newChunkPos.x - Chunk.chunkSize; x < newChunkPos.x + Chunk.chunkSize;
    x += Chunk.chunkSize)
00168                         {
00169                             for (int z = newChunkPos.z - Chunk.chunkSize; z < newChunkPos.z + Chunk.
    chunkSize; z += Chunk.chunkSize)
```

```
                        {
                            buildList.Add(new ChunkWorldPos(x, y * Chunk.chunkSize, z));
                        }
                    }
                }
                return;
            }
        }
    }
```

4.3.2.5 LoadAndRenderChunks()

`void BeeGame.Terrain.Chunks.LoadChunks.LoadAndRenderChunks ( ) [private]`

Gets the chunks that sould be built and renders then renders them

Definition at line 131 of file LoadChunks.cs.

```
    {
        //if their is somethign in the build list new chunks can be made
        if (buildList.Count != 0)
        {
            //makes all of the chunks in the build list. Works backwards through the list so that no chunk is missed because chunks are removed from the list as they are made
            for (int i = buildList.Count - 1, j = 0; i >= 0 && j < 8; i--, j++)
            {
                BuildChunk(buildList[0]);
                buildList.RemoveAt(0);
            }
        }
    }
```

4.3.2.6 Start()

`void BeeGame.Terrain.Chunks.LoadChunks.Start ( ) [private]`

Sets the world

Definition at line 80 of file LoadChunks.cs.

```
    {
        LandGeneration.Terrain.world = world;
    }
```

4.3.2.7 Update()

`void BeeGame.Terrain.Chunks.LoadChunks.Update ( ) [private]`

Builds, Renders, and Remmoves Chunks

Definition at line 88 of file LoadChunks.cs.

```
    {
        if (DeleteChunks())
            return;
        if (!world.chunkHasMadeCollisionMesh)
        {
            FindChunksToLoad();
            LoadAndRenderChunks();
            ApplyCollsionMeshToNearbyChunks();
        }
        //stops chunks being made and collision meshes being made at the same time
        world.chunkHasMadeCollisionMesh = false;
    }
```

4.3.3 Member Data Documentation

4.3.3.1 buildList

```
List<ChunkWorldPos> BeeGame.Terrain.Chunks.LoadChunks.buildList = new List<ChunkWorldPos>()
[private]
```

List if chunks to build

Definition at line 21 of file LoadChunks.cs.

4.3.3.2 chunkPositions

```
ChunkWorldPos [ ] BeeGame.Terrain.Chunks.LoadChunks.chunkPositions  [static], [private]
```

Positions to make chunks aroud the player ///

Definition at line 26 of file LoadChunks.cs.

4.3.3.3 nearbyChunks

```
ChunkWorldPos [ ] BeeGame.Terrain.Chunks.LoadChunks.nearbyChunks  [static], [private]
```

Initial value:

```
= new ChunkWorldPos[] { new ChunkWorldPos(0, 0, 0), new ChunkWorldPos(1, 0, 0), new ChunkWorldPos(-1, 0, 0)
        , new ChunkWorldPos(0, 0, 1), new ChunkWorldPos(0, 0, -1),
                                                                   new ChunkWorldPos(1, 0, 1), new
         ChunkWorldPos(1, 0, -1), new ChunkWorldPos(-1, 0, 1), new ChunkWorldPos(-1, 0, -1)}
```

Chunks in a 3x3 radius around the player that should have a collision mesh

Definition at line 69 of file LoadChunks.cs.

4.3.3.4 timer

```
int BeeGame.Terrain.Chunks.LoadChunks.timer = 0  [static], [private]
```

Timer for chunk removal

Definition at line 75 of file LoadChunks.cs.

4.3.3.5 world

```
World BeeGame.Terrain.Chunks.LoadChunks.world
```

The world the player is in

Definition at line 16 of file LoadChunks.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/Chunks/Load↩
  Chunks.cs

4.4 BeeGame.Terrain.Chunks.SaveChunk Class Reference

Saves a Chunks modified Blocks for save optimisation

Public Member Functions

- SaveChunk (Block[,,] blockArray)

  Will search all the the given Blocks for modified blocks

Public Attributes

- Dictionary< ChunkWorldPos, Block > blocks = new Dictionary<ChunkWorldPos, Block>()

  Blocks to be saved

4.4.1 Detailed Description

Saves a Chunks modified Blocks for save optimisation

Definition at line 12 of file SaveChunk.cs.

4.4.2 Constructor & Destructor Documentation

4.4.2.1 SaveChunk()

```
BeeGame.Terrain.Chunks.SaveChunk.SaveChunk (
              Block blockArray[,,] )
```

Will search all the the given Blocks for modified blocks

Parameters

blockArray	Chunks blocks (Must be [16, 16, 16])

Definition at line 23 of file SaveChunk.cs.

```
        {
            for (int x = 0; x < Chunk.chunkSize; x++)
            {
                for (int y = 0; y < Chunk.chunkSize; y++)
                {
                    for (int z = 0; z < Chunk.chunkSize; z++)
                    {
                        //*if the block has changed save it
                        if (blockArray[x, y, z].changed)
                            blocks.Add(new ChunkWorldPos(x, y, z), blockArray[x, y, z]);
                    }
                }
            }
        }
```

4.4.3 Member Data Documentation

4.4.3.1 blocks

```
Dictionary<ChunkWorldPos, Block> BeeGame.Terrain.Chunks.SaveChunk.blocks = new Dictionary<Chunk↩
WorldPos, Block>()
```

Blocks to be saved

Definition at line 17 of file SaveChunk.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/Chunks/SaveChunk.cs

4.5 BeeGame.Terrain.ChunkWorldPos Struct Reference

Serializable int version of THVector3

Public Member Functions

- ChunkWorldPos (int x, int y, int z)

  Constructor so that values can be input on creation of the vector
- override string ToString ()

  Formats the values nicely incase it is needed
- override bool Equals (object obj)
- override int GetHashCode ()

  Makes a unique hascode for the vector

Static Public Member Functions

- static implicit operator THVector3 (ChunkWorldPos pos)

  Converts a ChunkWorldPos to a THVector3 without the need for an explicit cast as no data will be lost
- static operator ChunkWorldPos (THVector3 pos)

  Converts a ChunkWorldPos to a THVector3

Public Attributes

- int x

    x, y, z values for the vector
- int y
- int z

4.5.1 Detailed Description

Serializable int version of THVector3

Definition at line 10 of file ChunkWorldPos.cs.

4.5.2 Constructor & Destructor Documentation

4.5.2.1 ChunkWorldPos()

```
BeeGame.Terrain.ChunkWorldPos.ChunkWorldPos (
                int x,
                int y,
                int z )
```

Constructor so that values can be input on creation of the vector

Parameters

x	X Value
y	Y Value
z	Z Value

Definition at line 23 of file ChunkWorldPos.cs.

```
        {
            this.x = x;
            this.y = y;
            this.z = z;
        }
```

4.5.3 Member Function Documentation

4.5.3.1 Equals()

```
override bool BeeGame.Terrain.ChunkWorldPos.Equals (
                object obj )
```

Definition at line 41 of file ChunkWorldPos.cs.

```
        {
            //possibly remove and just check if obj is null
            if (!(obj is ChunkWorldPos))
                return false;

            ChunkWorldPos temp = (ChunkWorldPos)obj;

            //possibly change to hashcode checking
            if (temp.x == x && temp.y == y && temp.z == z)
                return true;

            return false;
        }
```

4.5.3.2 GetHashCode()

`override int BeeGame.Terrain.ChunkWorldPos.GetHashCode ( )`

Makes a unique hascode for the vector

Returns

unique int value for the vector

Possible that 2 defferent values can give the same hashcode but chance of that happening and the vectors needing to be checked against each other is low

Definition at line 63 of file ChunkWorldPos.cs.

```
        {
            unchecked
            {
                int hashcode = 47;

                hashcode *= 227 + x.GetHashCode();
                hashcode *= 227 + y.GetHashCode();
                hashcode *= 227 + z.GetHashCode();

                return hashcode;
            }
        }
```

4.5.3.3 operator ChunkWorldPos()

```
static BeeGame.Terrain.ChunkWorldPos.operator ChunkWorldPos (
            THVector3 pos )  [explicit], [static]
```

Converts a ChunkWorldPos to a THVector3

Parameters

pos	A THVector3

Operator is explicit as data could be lost, THVector3 is a float and ChunkWorldPos is a int

Definition at line 93 of file ChunkWorldPos.cs.

```
        {
            return new ChunkWorldPos((int)pos.x, (int)pos.y, (int)pos.
    z);
        }
```

4.5.3.4 operator THVector3()

```
static implicit BeeGame.Terrain.ChunkWorldPos.operator THVector3 (
            ChunkWorldPos pos )  [static]
```

Converts a ChunkWorldPos to a THVector3 without the need for an explicit cast as no data will be lost

Parameters

pos	this ChunkWorldPos

Definition at line 81 of file ChunkWorldPos.cs.

```
        {
            return new THVector3(pos.x, pos.y, pos.z);
        }
```

4.5.3.5 ToString()

```
override string BeeGame.Terrain.ChunkWorldPos.ToString ( )
```

Formats the values nicely incase it is needed

Returns

Definition at line 34 of file ChunkWorldPos.cs.

```
        {
            return $"({x}, {y}, {z})";
        }
```

4.5.4 Member Data Documentation

4.5.4.1 x

```
int BeeGame.Terrain.ChunkWorldPos.x
```

x, y, z values for the vector

Definition at line 15 of file ChunkWorldPos.cs.

4.5.4.2 y

```
int BeeGame.Terrain.ChunkWorldPos.y
```

Definition at line 15 of file ChunkWorldPos.cs.

4.5.4.3 z

```
int BeeGame.Terrain.ChunkWorldPos.z
```

Definition at line 15 of file ChunkWorldPos.cs.

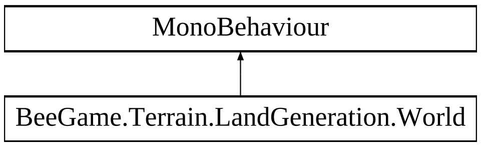
The documentation for this struct was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/ChunkWorldPos.cs

4.6 BeeGame.Terrain.LandGeneration.World Class Reference

Allows inter Chunk communication as it stores a list of active chunks

Inheritance diagram for BeeGame.Terrain.LandGeneration.World:



Public Member Functions

- void CreateChunk (int x, int y, int z)
  Creates a chunk at the given x, y, z
- void DestroyChunk (int x, int y, int z)
  Destroys a Chunk st the given x, y, z postion
- void SetBlock (int x, int y, int z, Block block, bool saveChunk=false)
  Sets a Block at the given position
- Chunk GetChunk (int x, int y, int z)
  Gets a chunk at eh given x, y, z
- Block GetBlock (int x, int y, int z)
  Gets a Block at the given position

Public Attributes

- Dictionary< ChunkWorldPos, Chunk > chunks = new Dictionary<ChunkWorldPos, Chunk>()
  All of the currently loaded chunks
- GameObject chunkPrefab
  The chunk prefab
- bool chunkHasMadeCollisionMesh = false
  Has a Chunk made a collision mesh?

Private Member Functions

- void UpdateIfEqual (int value1, int value2, ChunkWorldPos pos)

    Updates a chunk if value1 and value2 are equal

4.6.1 Detailed Description

Allows inter Chunk communication as it stores a list of active chunks

Definition at line 14 of file World.cs.

4.6.2 Member Function Documentation

4.6.2.1 CreateChunk()

```
void BeeGame.Terrain.LandGeneration.World.CreateChunk (
            int x,
            int y,
            int z )
```

Creates a chunk at the given x, y, z

Parameters

x	X pos to make the new chunk
y	Y pos to make the new chunk
z	Z pos to make the new chunk

Definition at line 41 of file World.cs.

```
        {
            //*pos of the chunk
            ChunkWorldPos pos = new ChunkWorldPos(x, y, z);

            //*makes the chunk at the given position
            GameObject newChunk = Instantiate(chunkPrefab, new Vector3(x, y, z), Quaternion.
    identity);

            Chunk chunk = newChunk.GetComponent<Chunk>();

            //*setting the chunks pos and a reference to this
            chunk.chunkWorldPos = pos;
            chunk.world = this;

            //*adds the nwe chunk to the dictionary
            chunks.Add(pos, chunk);

            //*generates the new chunks blocks
            chunk = new TerrainGeneration().ChunkGen(chunk);

            //loads any blocks that the chunk has had modified
            Serialization.Serialization.LoadChunk(chunk);

            //*updates all chunks around this one to reduce drawing of unecisary faces
            chunks.TryGetValue(new ChunkWorldPos(x, y - 16, z), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x, y, z - 16), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x - 16, y, z), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x, y + 16, z), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x, y, z + 16), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x + 16, y, z), out chunk);
            if (chunk != null)
                chunk.update = true;
            //*the chunk will then make its meshes
        }
```

4.6.2.2 DestroyChunk()

```
void BeeGame.Terrain.LandGeneration.World.DestroyChunk (
               int x,
               int y,
               int z )
```

Destroys a Chunk st the given x, y, z postion

Parameters

x	X pos if the chunk
y	Y pos if the chunk
z	Z pos if the chunk

Definition at line 97 of file World.cs.

```
        {
            //*if teh chnks exists destroy it
            if (chunks.TryGetValue(new ChunkWorldPos(x, y, z), out Chunk chunk))
            {
                //*saves the chunk before destroying it incase any block were changed in it
                Serialization.Serialization.SaveChunk(chunk);
                Destroy(chunk.gameObject);
                chunks.Remove(new ChunkWorldPos(x, y, z));
            }
        }
```

4.6.2.3 GetBlock()

```
Block BeeGame.Terrain.LandGeneration.World.GetBlock (
               int x,
               int y,
               int z )
```

Gets a Block at the given position

Parameters

x	X pos of the block
y	Y pos of the block
z	Z pos of the block

Returns

Block at given x, y, z position

Definition at line 184 of file World.cs.

```
        {
            //*gets the chunk that the block is in
            Chunk chunk = GetChunk(x, y, z);

            if(chunk != null)
            {
                //*gets the block in the chunk
                return chunk.GetBlock(x - chunk.chunkWorldPos.
    x, y - chunk.chunkWorldPos.y, z - chunk.chunkWorldPos.
    z);
            }

            //*returns an empty block is the chunk was not found
            return new Air();
        }
```

4.6.2.4 GetChunk()

```
Chunk BeeGame.Terrain.LandGeneration.World.GetChunk (
            int x,
            int y,
            int z )
```

Gets a chunk at eh given x, y, z

Parameters

x	X pos of the chunk
y	Y pos of the chunk
z	Z pos of the chunk

Returns

Chunk at given x, y, z

Definition at line 160 of file World.cs.

```
        {
            float multiple = Chunk.chunkSize;
            //*rounds the given x, y, z to a multiple of 16 as chunks are 16x16x16 in size
            ChunkWorldPos pos = new ChunkWorldPos()
            {
                x = Mathf.FloorToInt(x / multiple) * Chunk.chunkSize,
                y = Mathf.FloorToInt(y / multiple) * Chunk.chunkSize,
                z = Mathf.FloorToInt(z / multiple) * Chunk.chunkSize
            };

            //*gets the chunk if it exists
            chunks.TryGetValue(pos, out Chunk chunk);
            //*if the chunk does not exist will return null
            return chunk;
        }
```

4.6.2.5 SetBlock()

```
void BeeGame.Terrain.LandGeneration.World.SetBlock (
            int x,
            int y,
            int z,
            Block block,
            bool saveChunk = false )
```

Sets a Block at the given position

Parameters

x	X pos of the block
y	Y pos of the block
z	Z pos of the block
block	Block to be placed

Definition at line 118 of file World.cs.

```
        {
            //*gets the chunk for the block to be placed in
            Chunk chunk = GetChunk(x, y, z);

            //*if the chunk is not null and the block trying to be replaced is replaceable, replace it
            if(chunk != null && chunk.blocks[x - chunk.chunkWorldPos.
      x, y - chunk.chunkWorldPos.y, z - chunk.chunkWorldPos.
      z].breakable)
            {

                chunk.SetBlock(x - chunk.chunkWorldPos.x, y - chunk.
      chunkWorldPos.y, z - chunk.chunkWorldPos.z, block);
                chunk.update = true;

                //*updates the nebouring chunks as when a block is broken it may be in the edje of the
       chunk so their meshes also need to be updated
                //*only updates chunks that need to be updated as not every chunk will need to be and
       sometines none of them will need to be

                //*checks if the block chaged is in the edge if the x value for the chunk
                UpdateIfEqual(x - chunk.chunkWorldPos.
      x, 0, new ChunkWorldPos(x - 1, y, z));
                UpdateIfEqual(x - chunk.chunkWorldPos.
      x, Chunk.chunkSize - 1, new ChunkWorldPos(x + 1, y, z));

                //*checks if the block chaged is in the edge if the y value for the chunk
                UpdateIfEqual(y - chunk.chunkWorldPos.
      y, 0, new ChunkWorldPos(x, y - 1, z));
                UpdateIfEqual(y - chunk.chunkWorldPos.
      y, Chunk.chunkSize - 1, new ChunkWorldPos(x, y + 1, z));

                //*checks if the block chaged is in the edge if the z value for the chunk
                UpdateIfEqual(z - chunk.chunkWorldPos.
      z, 0, new ChunkWorldPos(x, y, z - 1));
                UpdateIfEqual(z - chunk.chunkWorldPos.
      z, Chunk.chunkSize - 1, new ChunkWorldPos(x, y, z + 1));

```

```
                if (saveChunk)
                    Serialization.Serialization.SaveChunk(chunk);
            }
        }
```

4.6.2.6 UpdateIfEqual()

```
void BeeGame.Terrain.LandGeneration.World.UpdateIfEqual (
            int value1,
            int value2,
            ChunkWorldPos pos )  [private]
```

Updates a chunk if *value1* and *value2* are equal

Parameters

value1	First value to check
value2	Second value to check
pos	Position of chunk to update if values are equal

Definition at line 206 of file World.cs.

```
        {
            if(value1 == value2)
            {
                Chunk chunk = GetChunk(pos.x, pos.y, pos.z);

                if (chunk != null)
                    chunk.update = true;
            }
        }
```

4.6.3 Member Data Documentation

4.6.3.1 chunkHasMadeCollisionMesh

```
bool BeeGame.Terrain.LandGeneration.World.chunkHasMadeCollisionMesh = false
```

Has a Chunk made a collision mesh?

Definition at line 30 of file World.cs.

4.6.3.2 chunkPrefab

```
GameObject BeeGame.Terrain.LandGeneration.World.chunkPrefab
```

The chunk prefab

Definition at line 25 of file World.cs.

4.6.3.3 chunks

```
Dictionary<ChunkWorldPos, Chunk> BeeGame.Terrain.LandGeneration.World.chunks = new Dictionary<Chunk←
WorldPos, Chunk>()
```

All of the currently loaded chunks

Definition at line 20 of file World.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/LandGeneration/World.←
  cs

4.7 BeeGame.Terrain.LandGeneration.Terrain Class Reference

Should use as an interface between the rest of the game and the terrain

Static Public Member Functions

- static ChunkWorldPos GetBlockPos (THVector3 pos)

  Gets a block postion from a THVector3
- static THVector3 GetBlockPos (RaycastHit hit)

  Returns the positon of the block hit as a THVector3
- static ChunkWorldPos GetBlockPosFromRayCast (RaycastHit hit)

  GetBlockPos(THVector3) does the same thing but returns a ChunkWorldPos
- static float Round (float pos, float norm, bool adjacent=false)

  Rounds the given pos to the correct position
- static ChunkWorldPos GetBlockPos (RaycastHit hit, bool adjacent=false)

  Gets a Chunks world positon
- static Block GetBlock (RaycastHit hit, bool adjacent=false)

  Get a Block at the given position
- static Block GetBlock (THVector3 pos)
- static bool BlockInPosition (THVector3 pos, Chunk chunk)
- static Chunk GetChunk (THVector3 vec3)
- static bool SetBlock (RaycastHit hit, Block block, bool adjacent=false)

  Sets the Block at the given point the given Block

Static Public Attributes

- static World world

Static Private Member Functions

- static float RoundXZ (float pos, float normal)

  Used to round the X/Z values when getting a block
- static float RoundY (float pos, float normal)

  Round the Y value of the given coord

4.7.1 Detailed Description

Should use as an interface between the rest of the game and the terrain

Definition at line 15 of file Terrain.cs.

4.7.2 Member Function Documentation

4.7.2.1 BlockInPosition()

```
static bool BeeGame.Terrain.LandGeneration.Terrain.BlockInPosition (
             THVector3 pos,
             Chunk chunk )  [static]
```

Definition at line 250 of file Terrain.cs.

```
        {
            if (chunk == null)
                return false;

            if (chunk.GetBlock((int)pos.x, (int)pos.y, (int)pos.z) != new
      Air())
                return true;

            return false;
        }
```

4.7.2.2 GetBlock() [1/2]

```
static Block BeeGame.Terrain.LandGeneration.Terrain.GetBlock (
             RaycastHit hit,
             bool adjacent = false )  [static]
```

Get a Block at the given position

Parameters

hit	Where to get the block from
adjacent	Should the adjacent Block be returned

Returns

Block at *hit.point* , Null if no block was found

Definition at line 224 of file Terrain.cs.

```
        {
            //*checks that a chunk was hit and if it wasnt return early
            Chunk chunk = hit.collider.GetComponent<Chunk>();
            if (chunk == null)
                return null;

            //*allignes the hit to the block grid and returns the block
            ChunkWorldPos pos = GetBlockPos(hit, adjacent);

            return chunk.world.GetBlock(pos.x, pos.y, pos.z);
        }
```

4.7.2.3 GetBlock() [2/2]

```
static Block BeeGame.Terrain.LandGeneration.Terrain.GetBlock (
            THVector3 pos )  [static]
```

Definition at line 238 of file Terrain.cs.

```
    {
        Chunk chunk = GetChunk(pos);

        if (chunk == null)
            return new Air();

        chunk.world.GetBlock((int)pos.x, (int)pos.y, (int)pos.z);

        return new Block();
    }
```

4.7.2.4 GetBlockPos() [1/3]

```
static ChunkWorldPos BeeGame.Terrain.LandGeneration.Terrain.GetBlockPos (
            THVector3 pos )  [static]
```

Gets a block postion from a THVector3

Parameters

pos	Position of the block as a THVector3

Returns

ChunkWorldPos of the Block

Definition at line 25 of file Terrain.cs.

```
    {
        return new ChunkWorldPos()
        {
            x = Mathf.RoundToInt(pos.x),
            y = Mathf.RoundToInt(pos.y),
            z = Mathf.RoundToInt(pos.z)
        };
    }
```

4.7.2.5 GetBlockPos() [2/3]

```
static THVector3 BeeGame.Terrain.LandGeneration.Terrain.GetBlockPos (
              RaycastHit hit )  [static]
```

Returns the positon of the block hit as a THVector3

Parameters

hit	RaycastHit
adjacent	Do you want the face adjecent to the block hit

Returns

THVector3 of the block you hit in world cordinates

Definition at line 41 of file Terrain.cs.

```
        {
            THVector3 vec3 = new THVector3()
            {
                x = RoundXZ(hit.point.x, hit.normal.x),
                y = RoundY(hit.point.y, hit.normal.y),
                z = RoundXZ(hit.point.z, hit.normal.z)
            };
            return (vec3);
        }
```

4.7.2.6 GetBlockPos() [3/3]

```
static ChunkWorldPos BeeGame.Terrain.LandGeneration.Terrain.GetBlockPos (
              RaycastHit hit,
              bool adjacent = false )  [static]
```

Gets a Chunks world positon

Parameters

hit	Where the raycast hit
adjacent	Should the adjacent Chunk position be returned?

Returns

ChunkWorldPos of the Chunk

Returns

Definition at line 207 of file Terrain.cs.

```
        {
            return GetBlockPos(new THVector3()
            {
                //*rounds the hit to the correct position
                x = Round(hit.point.x, hit.normal.x, adjacent),
                y = Round(hit.point.y, hit.normal.y, adjacent),
                z = Round(hit.point.z, hit.normal.z, adjacent)
            });
        }
```

4.7.2.7 GetBlockPosFromRayCast()

```
static ChunkWorldPos BeeGame.Terrain.LandGeneration.Terrain.GetBlockPosFromRayCast (
            RaycastHit hit )  [static]
```

GetBlockPos(THVector3) does the same thing but returns a ChunkWorldPos

Parameters

hit	

Returns

Definition at line 57 of file Terrain.cs.

```
        {
            return new ChunkWorldPos((int)RoundXZ(hit.point.x, hit.normal.x), (int)
      RoundY(hit.point.y, hit.normal.y), (int)RoundXZ(hit.point.z, hit.normal.z));
        }
```

4.7.2.8 GetChunk()

```
static Chunk BeeGame.Terrain.LandGeneration.Terrain.GetChunk (
            THVector3 vec3 )  [static]
```

Definition at line 262 of file Terrain.cs.

```
        {
            return world.GetChunk((int)vec3.x, (int)vec3.y, (int)vec3.
      z);
        }
```

4.7.2.9 Round()

```
static float BeeGame.Terrain.LandGeneration.Terrain.Round (
            float pos,
            float norm,
            bool adjacent = false )  [static]
```

Rounds the given pos to the correct position

Parameters

pos	Position that needs to be rounded
norm	Normal for the face
adjacent	Should the adjacent block be recived

Returns

rounded value of *pos* as a float

Check how this performs. Possibly change all uses of this to RoundXZ(float, float) and RoundY(float, float)

Definition at line 182 of file Terrain.cs.

```
        {
            if(pos - (int)pos == 0.5f || pos - (int)pos == -0.5f)
            {
                if(adjacent)
                {
                    pos += (norm / 2);
                }
                else
                {
                    pos -= (norm / 2);
                }
            }

            return pos;
        }
```

4.7.2.10 RoundXZ()

```
static float BeeGame.Terrain.LandGeneration.Terrain.RoundXZ (
            float pos,
            float normal )  [static], [private]
```

Used to round the X/Z values when getting a block

Parameters

pos	X/Y pos
normal	X/Y normal

Returns

rounded *pos*

Do I realy need to do all this?

Definition at line 71 of file Terrain.cs.

```
        {
            //*if we are looking at + x/z vlaues
            if (pos > 0)
            {
                if (normal > 0)
                {
                    pos = (int)pos;
                    return pos;
                }
                else if (normal < 0)
                {
                    pos = (int)pos;
                    return pos - -1;
                }
                else
                {
                    if ((pos - (int)pos) > 0.5)
                    {
                        return (int)pos + 1;
                    }
                    return (int)pos;
                }
            }
            //*if we are looking at - x/z values
            else
            {
                //*if poitive normal
                if (normal > 0)
                {
                    pos = (int)pos;
                    return pos - 1;
                }

                //*if negative nomrmal
                if (normal < 0)
                {
                    pos = (int)pos;
                    return pos;
                }
                //*if their is no normal

                //*if pos is greater than 0.5 we are in the next block so go to it
                if ((-pos - (int)-pos) > 0.5)
                {
                    return (int)pos - 1;
                }

                return (int)pos;
            }
        }
```

4.7.2.11 RoundY()

```
static float BeeGame.Terrain.LandGeneration.Terrain.RoundY (
            float pos,
            float normal )  [static], [private]
```

Round the Y value of the given coord

Parameters

pos	Y pos
normal	Y normal

Returns

pos rounded to 1 DP

Do I have to do this? or is their an easier way to do this

Definition at line 132 of file Terrain.cs.

```
        {
            pos = (float)Math.Round(pos, 1);
            if (pos >= 0)
            {
                if(normal > 0)
                {
                    if((int)pos % 2 == 0)
                        return Mathf.RoundToInt((float)Math.Round(pos, 1));

                    return Mathf.RoundToInt((float)Math.Round(pos, 1)) - normal;
                }

                if((int)pos % 2 == 0)
                    return Mathf.RoundToInt((float)Math.Round(pos, 1)) - normal;

                return Mathf.RoundToInt((float)Math.Round(pos, 1));
            }

            if(pos <= 0)
            {
                if (normal > 0)
                {
                    if ((int)pos % 2 == 0)
                        //*the Math.Round removes strange rounding errors shown with Mathf.Round eg sometimes 0.5 would round to 0 not 1
                        return Mathf.RoundToInt((float)Math.Round(pos, 1)) - normal;

                    return Mathf.RoundToInt((float)Math.Round(pos, 1));// - normal;
                }

                if ((int)pos % 2 == 0)
                    return Mathf.RoundToInt((float)Math.Round(pos, 1));

                return Mathf.RoundToInt((float)Math.Round(pos, 1)) - normal;
            }


            return Mathf.RoundToInt((float)Math.Round(pos, 1));
        }
```

4.7.2.12 SetBlock()

```
static bool BeeGame.Terrain.LandGeneration.Terrain.SetBlock (
            RaycastHit hit,
            Block block,
            bool adjacent = false )   [static]
```

Sets the Block at the given point the given Block

Parameters

hit	Where the block should be set
block	Block to be set
adjacent	Should the adjacent Block be set

Returns

true if block was set

Definition at line 275 of file Terrain.cs.

```
        {
            //*checks that a chnk was hit
            Chunk chunk = hit.collider.GetComponent<Chunk>();

            if (chunk == null)
```

```
                return false;

            //*alligns the hit to the block grid
            ChunkWorldPos pos = GetBlockPosFromRayCast(hit);

            //*checks that the block tryign to be replaced can be replaced eg bedrock cannot be replaced
            if (GetBlock(hit, adjacent).breakable)
            {
                //*sets the position of the block and saves the chunk
                chunk.world.SetBlock(pos.x, pos.y, pos.z, block);
                Serialization.Serialization.SaveChunk(chunk);
            }

            return true;
        }
```

4.7.3 Member Data Documentation

4.7.3.1 world

`World BeeGame.Terrain.LandGeneration.Terrain.world [static]`

Definition at line 17 of file Terrain.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/LandGeneration/Terrain.↩
cs

4.8 BeeGame.Terrain.LandGeneration.TerrainGeneration Class Reference

Generates the terrain for the game

Public Member Functions

- Chunk ChunkGen (Chunk chunk)

  Generates a Chunk in a new thread
- void ChunkGenThread (Chunk chunk, out Chunk outChunk)

  Generates a new Chunk
- Chunk GenChunkColum (Chunk chunk, int x, int z)

  Generates a colum of the Chunk

Static Public Member Functions

- static int GetNoise (int x, int y, int z, float scale, int max)

  Get a noise value
- static void SetBlock (int x, int y, int z, Blocks.Block block, Chunk chunk, bool replacesBlocks=false)

  Sets a Block in the position

Private Attributes

- float stoneBaseHeight = -24

    Base height of stone
- float stoneBaseNoise = 0.05f

    Base noise of stone
- float stoneBaseNoiseHeight = 4

    Base noise heigh for stone
- float stoneMountainHeight = 48

    Base height for a mountain
- float stoneMountainFrequency = 0.008f

    Frequency of mountains (larger value = more choppy terrain)
- float stoneMinHeight = -12

    Minimun height for stone
- float dirtBaseHeight = 1

    Where does dirt start
- float dirtNoise = 0.04f

    How much of the surface is dirt
- float dirtNoiseHeight = 3

    How tall dirt can be
- float caveFrequency = 0.025f

    How often do caves happen
- int caveSize = 8

    Threashold for makeing a cave

4.8.1 Detailed Description

Generates the terrain for the game

Definition at line 13 of file TerrainGeneration.cs.

4.8.2 Member Function Documentation

4.8.2.1 ChunkGen()

```
Chunk BeeGame.Terrain.LandGeneration.TerrainGeneration.ChunkGen (
            Chunk chunk )
```

Generates a Chunk in a new thread

Parameters

chunk	Chunk to populate with Blocks

Returns

Chunk with Blocks generated

Definition at line 70 of file TerrainGeneration.cs.

```
        {
            Chunk outChunk = chunk;
            lock (chunk)
            {
                Thread thread = new Thread(() => ChunkGenThread(chunk, out outChunk)) { Name
 = $"Generate Chunk Thread @ {chunk.chunkWorldPos}"};

                thread.Start();
                return outChunk;
            }
        }
```

4.8.2.2 ChunkGenThread()

```
void BeeGame.Terrain.LandGeneration.TerrainGeneration.ChunkGenThread (
               Chunk chunk,
               out Chunk outChunk )
```

Generates a new Chunk

Parameters

chunk	Chunk to be generated
outChunk	Generated Chunk to return

Definition at line 87 of file TerrainGeneration.cs.

```
        {
            //*for each x and z position in teh chunk
            for (int x = chunk.chunkWorldPos.x; x < chunk.
 chunkWorldPos.x + Chunk.chunkSize; x++)
            {
                for (int z = chunk.chunkWorldPos.z; z < chunk.
 chunkWorldPos.z + Chunk.chunkSize; z++)
                {
                    chunk = GenChunkColum(chunk, x, z);
                }
            }

            chunk.SetBlocksUnmodified();
            outChunk = chunk;
        }
```

4.8.2.3 GenChunkColum()

```
Chunk BeeGame.Terrain.LandGeneration.TerrainGeneration.GenChunkColum (
               Chunk chunk,
               int x,
               int z )
```

Generates a colum of the Chunk

Parameters

chunk	Chunk to generate a colum for
x	X pos to make the colum
z	Z pos to make the colum

Returns

Chunk with a new colum ob blocks generated

Definition at line 109 of file TerrainGeneration.cs.

```
        {
            //*the height of the mountain
            int stoneHeight = Mathf.FloorToInt(stoneBaseHeight);
            stoneHeight += GetNoise(-x, 0, z, stoneMountainFrequency, Mathf.FloorToInt(stoneMountainHeight));

            //*if the colum is currenly to low make it not so low
            if (stoneHeight < stoneMinHeight)
                stoneHeight = Mathf.FloorToInt(stoneMinHeight);

            //*add the height of normal stone on to the mountain
            stoneHeight += GetNoise(x, 0, -z, stoneBaseNoise, Mathf.RoundToInt(stoneBaseNoiseHeight));

            //*put dirt on top
            int dirtHeight = stoneHeight + Mathf.FloorToInt(dirtBaseHeight);
            dirtHeight += GetNoise(x, 100, z, dirtNoise, Mathf.FloorToInt(dirtNoiseHeight));

            //*set the colum to the correct blocks
            for (int y = chunk.chunkWorldPos.y; y < chunk.chunkWorldPos.y + Chunk.chunkSize; y ++)
            {
                int caveChance = GetNoise(x + 40, y + 100, z - 50, caveFrequency, 200);

                //*puts a layer of bedrock at the botton the the world
                if (y <= (chunk.chunkWorldPos.y) && chunk.chunkWorldPos.y == -16)
                {
                    SetBlock(x, y, z, new Blocks.Bedrock(), chunk);
                }
                else if (y <= stoneHeight && caveSize < caveChance)
                {
                    SetBlock(x, y, z, new Blocks.Block(), chunk);
                }
                else if (y <= dirtHeight && caveSize < caveChance)
                {
                    SetBlock(x, y, z, new Blocks.Grass(), chunk);
                }
                else
                {
                    SetBlock(x, y, z, new Blocks.Air(), chunk);
                }
            }

                return chunk;
        }
```

4.8.2.4 GetNoise()

```
static int BeeGame.Terrain.LandGeneration.TerrainGeneration.GetNoise (
              int x,
              int y,
              int z,
              float scale,
              int max )  [static]
```

Get a noise value

Parameters

x	X pos of the noise
y	Y pos of the noise
z	Z pos of the noise
scale	What the step shout bee from the last x, y, z
max	Max value of the noise

Returns

A noise value as an int

Definition at line 162 of file TerrainGeneration.cs.

```
        {
            return Mathf.FloorToInt((SimplexNoise.Generate(x * scale, y * scale, z *
    scale) + 1f) * (max / 2f));
        }
```

4.8.2.5 SetBlock()

```
static void BeeGame.Terrain.LandGeneration.TerrainGeneration.SetBlock (
             int x,
             int y,
             int z,
             Blocks.Block block,
             Chunk chunk,
             bool replacesBlocks = false )  [static]
```

Sets a Block in the position

Parameters

x	X pos of the block
y	Y pos of the block
z	Z pos of the block
block	Block to set
chunk	Chunk to set the block in
replacesBlocks	Can it replace blocks

Definition at line 176 of file TerrainGeneration.cs.

```
        {
            //*corrects the x, y, z pos of the so that the block is placed in the correct position
            x -= chunk.chunkWorldPos.x;
            y -= chunk.chunkWorldPos.y;
            z -= chunk.chunkWorldPos.z;

            //*chechs that the block is in the chunk and that no block is already their then sets it
            if (Chunk.InRange(x) && Chunk.InRange(y) &&
    Chunk.InRange(z))
                if (replacesBlocks || chunk.blocks[x, y, z] == null)
                    chunk.SetBlock(x, y, z, block);
        }
```

4.8.3 Member Data Documentation

4.8.3.1 caveFrequency

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.caveFrequency = 0.025f  [private]
```

How often do caves happen

Definition at line 58 of file TerrainGeneration.cs.

4.8.3.2 caveSize

```
int BeeGame.Terrain.LandGeneration.TerrainGeneration.caveSize = 8  [private]
```

Threashold for makeing a cave

Definition at line 62 of file TerrainGeneration.cs.

4.8.3.3 dirtBaseHeight

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.dirtBaseHeight = 1  [private]
```

Where does dirt start

Definition at line 45 of file TerrainGeneration.cs.

4.8.3.4 dirtNoise

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.dirtNoise = 0.04f  [private]
```

How much of the surface is dirt

Definition at line 49 of file TerrainGeneration.cs.

4.8.3.5 dirtNoiseHeight

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.dirtNoiseHeight = 3  [private]
```

How tall dirt can be

Definition at line 53 of file TerrainGeneration.cs.

4.8.3.6 stoneBaseHeight

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.stoneBaseHeight = -24  [private]
```

Base height of stone

Definition at line 19 of file TerrainGeneration.cs.

4.8.3.7 stoneBaseNoise

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.stoneBaseNoise = 0.05f  [private]
```

Base noise of stone

Definition at line 23 of file TerrainGeneration.cs.

4.8.3.8 stoneBaseNoiseHeight

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.stoneBaseNoiseHeight = 4  [private]
```

Base noise heigh for stone

Definition at line 27 of file TerrainGeneration.cs.

4.8.3.9 stoneMinHeight

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.stoneMinHeight = -12  [private]
```

Minimun height for stone

Definition at line 40 of file TerrainGeneration.cs.

4.8.3.10 stoneMountainFrequency

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.stoneMountainFrequency = 0.008f  [private]
```

Frequency of mountains (larger value = more choppy terrain)

Definition at line 36 of file TerrainGeneration.cs.

4.8.3.11 stoneMountainHeight

```
float BeeGame.Terrain.LandGeneration.TerrainGeneration.stoneMountainHeight = 48  [private]
```

Base height for a mountain

Definition at line 32 of file TerrainGeneration.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/LandGeneration/Terrain←
  Generation.cs

4.9 BeeGame.Terrain.LandGeneration.Noise.SimplexNoise Class Reference

Implementation of the Perlin simplex noise, an improved Perlin noise algorithm. Based loosely on SimplexNoise1234 by Stefan Gustavson <`http://`∗staffwww.itn.liu.se/∼stegu/aqsis/aqsis-newnoise/>

Static Public Member Functions

- static float Generate (float x)

    1D simplex noise
- static float Generate (float x, float y)

    2D simplex noise
- static float Generate (float x, float y, float z)

Static Public Attributes

- static byte [ ] perm

Static Private Member Functions

- static int FastFloor (float x)
- static int Mod (int x, int m)
- static float grad (int hash, float x)
- static float grad (int hash, float x, float y)
- static float grad (int hash, float x, float y, float z)
- static float grad (int hash, float x, float y, float z, float t)

4.9.1 Detailed Description

Implementation of the Perlin simplex noise, an improved Perlin noise algorithm. Based loosely on SimplexNoise1234 by Stefan Gustavson <`http://`∗staffwww.itn.liu.se/∼stegu/aqsis/aqsis-newnoise/>

Definition at line 37 of file SimplexNoise.cs.

4.9.2 Member Function Documentation

4.9.2.1 FastFloor()

```
static int BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.FastFloor (
            float x ) [static], [private]
```

Definition at line 272 of file SimplexNoise.cs.

```
        {
            return (x > 0) ? ((int)x) : (((int)x) - 1);
        }
```

4.9.2.2 Generate() [1/3]

```
static float BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.Generate (
            float x ) [static]
```

1D simplex noise

Parameters

x	

Returns

Definition at line 44 of file SimplexNoise.cs.

```
        {
            int i0 = FastFloor(x);
            int i1 = i0 + 1;
            float x0 = x - i0;
            float x1 = x0 - 1.0f;

            float n0, n1;

            float t0 = 1.0f - x0 * x0;
            t0 *= t0;
            n0 = t0 * t0 * grad(perm[i0 & 0xff], x0);

            float t1 = 1.0f - x1 * x1;
            t1 *= t1;
            n1 = t1 * t1 * grad(perm[i1 & 0xff], x1);
            //* The maximum value of this noise is 8*(3/4)^4 = 2.53125
            //* A factor of 0.395 scales to fit exactly within [-1,1]
            return 0.395f * (n0 + n1);
        }
```

4.9.2.3 Generate() [2/3]

```
static float BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.Generate (
            float x,
            float y ) [static]
```

2D simplex noise

Parameters

x	
y	

Returns

Definition at line 71 of file SimplexNoise.cs.

```
        {
            const float F2 = 0.366025403f; //* F2 = 0.5*(sqrt(3.0)-1.0)
            const float G2 = 0.211324865f; //* G2 = (3.0-Math.sqrt(3.0))/6.0

            float n0, n1, n2; //* Noise contributions from the three corners

            //* Skew the input space to determine which simplex cell we're in
            float s = (x + y) * F2; //* Hairy factor for 2D
            float xs = x + s;
            float ys = y + s;
            int i = FastFloor(xs);
            int j = FastFloor(ys);

            float t = (float)(i + j) * G2;
            float X0 = i - t; //* Unskew the cell origin back to (x,y) space
            float Y0 = j - t;
            float x0 = x - X0; //* The x,y distances from the cell origin
            float y0 = y - Y0;

            //* For the 2D case, the simplex shape is an equilateral triangle.
            //* Determine which simplex we are in.
            int i1, j1; //* Offsets for second (middle) corner of simplex in (i,j) coords
            if (x0 > y0) { i1 = 1; j1 = 0; } //* lower triangle, XY order: (0,0)->(1,0)->(1,1)
            else { i1 = 0; j1 = 1; }      //* upper triangle, YX order: (0,0)->(0,1)->(1,1)

            //* A step of (1,0) in (i,j) means a step of (1-c,-c) in (x,y), and
            //* a step of (0,1) in (i,j) means a step of (-c,1-c) in (x,y), where
            //* c = (3-sqrt(3))/6

            float x1 = x0 - i1 + G2; //* Offsets for middle corner in (x,y) unskewed coords
            float y1 = y0 - j1 + G2;
            float x2 = x0 - 1.0f + 2.0f * G2; //* Offsets for last corner in (x,y) unskewed coords
            float y2 = y0 - 1.0f + 2.0f * G2;

            //* Wrap the integer indices at 256, to avoid indexing perm[] out of bounds
            int ii = i % 256;
            int jj = j % 256;

            //* Calculate the contribution from the three corners
            float t0 = 0.5f - x0 * x0 - y0 * y0;
            if (t0 < 0.0f) n0 = 0.0f;
            else
            {
                t0 *= t0;
                n0 = t0 * t0 * grad(perm[ii + perm[jj]], x0, y0);
            }

            float t1 = 0.5f - x1 * x1 - y1 * y1;
            if (t1 < 0.0f) n1 = 0.0f;
            else
            {
                t1 *= t1;
                n1 = t1 * t1 * grad(perm[ii + i1 + perm[jj + j1]], x1, y1);
            }

            float t2 = 0.5f - x2 * x2 - y2 * y2;
            if (t2 < 0.0f) n2 = 0.0f;
            else
            {
                t2 *= t2;
                n2 = t2 * t2 * grad(perm[ii + 1 + perm[jj + 1]], x2, y2);
            }

            //* Add contributions from each corner to get the final noise value.
            //* The result is scaled to return values in the interval [-1,1].
            return 40.0f * (n0 + n1 + n2); //* TODO: The scale factor is preliminary!
        }
```

4.9.2.4 Generate() [3/3]

```
static float BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.Generate (
            float x,
            float y,
            float z ) [static]
```

Definition at line 141 of file SimplexNoise.cs.

```
        {
            //* Simple skewing factors for the 3D case
            const float F3 = 0.333333333f;
            const float G3 = 0.166666667f;

            float n0, n1, n2, n3; //* Noise contributions from the four corners

            //* Skew the input space to determine which simplex cell we're in
            float s = (x + y + z) * F3; //* Very nice and simple skew factor for 3D
            float xs = x + s;
            float ys = y + s;
            float zs = z + s;
            int i = FastFloor(xs);
            int j = FastFloor(ys);
            int k = FastFloor(zs);

            float t = (float)(i + j + k) * G3;
            float X0 = i - t; //* Unskew the cell origin back to (x,y,z) space
            float Y0 = j - t;
            float Z0 = k - t;
            float x0 = x - X0; //* The x,y,z distances from the cell origin
            float y0 = y - Y0;
            float z0 = z - Z0;

            //* For the 3D case, the simplex shape is a slightly irregular tetrahedron.
            //* Determine which simplex we are in.
            int i1, j1, k1; //* Offsets for second corner of simplex in (i,j,k) coords
            int i2, j2, k2; //* Offsets for third corner of simplex in (i,j,k) coords

            /* This code would benefit from a backport from the GLSL version! */
            if (x0 >= y0)
            {
                if (y0 >= z0)
                { i1 = 1; j1 = 0; k1 = 0; i2 = 1; j2 = 1; k2 = 0; } //* X Y Z order
                else if (x0 >= z0) { i1 = 1; j1 = 0; k1 = 0; i2 = 1; j2 = 0; k2 = 1; } //* X Z Y order
                else { i1 = 0; j1 = 0; k1 = 1; i2 = 1; j2 = 0; k2 = 1; } //* Z X Y order
            }
            else
            { //* x0<y0
                if (y0 < z0) { i1 = 0; j1 = 0; k1 = 1; i2 = 0; j2 = 1; k2 = 1; } //* Z Y X order
                else if (x0 < z0) { i1 = 0; j1 = 1; k1 = 0; i2 = 0; j2 = 1; k2 = 1; } //* Y Z X order
                else { i1 = 0; j1 = 1; k1 = 0; i2 = 1; j2 = 1; k2 = 0; } //* Y X Z order
            }

            //* A step of (1,0,0) in (i,j,k) means a step of (1-c,-c,-c) in (x,y,z),
            //* a step of (0,1,0) in (i,j,k) means a step of (-c,1-c,-c) in (x,y,z), and
            //* a step of (0,0,1) in (i,j,k) means a step of (-c,-c,1-c) in (x,y,z), where
            //* c = 1/6.

            float x1 = x0 - i1 + G3; //* Offsets for second corner in (x,y,z) coords
            float y1 = y0 - j1 + G3;
            float z1 = z0 - k1 + G3;
            float x2 = x0 - i2 + 2.0f * G3; //* Offsets for third corner in (x,y,z) coords
            float y2 = y0 - j2 + 2.0f * G3;
            float z2 = z0 - k2 + 2.0f * G3;
            float x3 = x0 - 1.0f + 3.0f * G3; //* Offsets for last corner in (x,y,z) coords
            float y3 = y0 - 1.0f + 3.0f * G3;
            float z3 = z0 - 1.0f + 3.0f * G3;

            //* Wrap the integer indices at 256, to avoid indexing perm[] out of bounds
            int ii = Mod(i, 256);
            int jj = Mod(j, 256);
            int kk = Mod(k, 256);

            //* Calculate the contribution from the four corners
            float t0 = 0.6f - x0 * x0 - y0 * y0 - z0 * z0;
            if (t0 < 0.0f) n0 = 0.0f;
            else
            {
                t0 *= t0;
                n0 = t0 * t0 * grad(perm[ii + perm[jj + perm[kk]]], x0, y0, z0);
            }

            float t1 = 0.6f - x1 * x1 - y1 * y1 - z1 * z1;
            if (t1 < 0.0f) n1 = 0.0f;
            else
            {
                t1 *= t1;
                n1 = t1 * t1 * grad(perm[ii + i1 + perm[jj + j1 +
perm[kk + k1]]], x1, y1, z1);
            }

            float t2 = 0.6f - x2 * x2 - y2 * y2 - z2 * z2;
            if (t2 < 0.0f) n2 = 0.0f;
            else
            {
                t2 *= t2;
                n2 = t2 * t2 * grad(perm[ii + i2 + perm[jj + j2 +
perm[kk + k2]]], x2, y2, z2);
            }

            float t3 = 0.6f - x3 * x3 - y3 * y3 - z3 * z3;
            if (t3 < 0.0f) n3 = 0.0f;
            else
            {
                t3 *= t3;
                n3 = t3 * t3 * grad(perm[ii + 1 + perm[jj + 1 + perm[kk + 1]]], x3, y3, z3)
;
            }

            //* Add contributions from each corner to get the final noise value.
            //* The result is scaled to stay just inside [-1,1]
            return 32.0f * (n0 + n1 + n2 + n3); //* TODO: The scale factor is preliminary!
        }
```

4.9.2.5 grad() [1/4]

static float BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.grad (
    int *hash*,
    float *x*) [static], [private]

Definition at line 283 of file SimplexNoise.cs.

```
        {
            int h = hash & 15;
            float grad = 1.0f + (h & 7);   //* Gradient value 1.0, 2.0, ..., 8.0
            if ((h & 8) != 0) grad = -grad;         //* Set a random sign for the gradient
            return (grad * x);           //* Multiply the gradient with the distance
        }
```

4.9.2.6 grad() [2/4]

static float BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.grad (
    int *hash*,
    float *x*,
    float *y*) [static], [private]

Definition at line 291 of file SimplexNoise.cs.

```
        {
            int h = hash & 7;      //* Convert low 3 bits of hash code
            float u = h < 4 ? x : y;  //* into 8 simple gradient directions,
            float v = h < 4 ? y : x;  //* and compute the dot product with (x,y).
            return ((h & 1) != 0 ? -u : u) + ((h & 2) != 0 ? -2.0f * v : 2.0f * v);
        }
```

4.9.2.7 grad() [3/4]

```
static float BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.grad (
            int hash,
            float x,
            float y,
            float z ) [static], [private]
```

Definition at line 299 of file SimplexNoise.cs.

```
        {
            int h = hash & 15;     //* Convert low 4 bits of hash code into 12 simple
            float u = h < 8 ? x : y; //* gradient directions, and compute dot product.
            float v = h < 4 ? y : h == 12 || h == 14 ? x : z; //* Fix repeats at h = 12 to 15
            return ((h & 1) != 0 ? -u : u) + ((h & 2) != 0 ? -v : v);
        }
```

4.9.2.8 grad() [4/4]

```
static float BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.grad (
            int hash,
            float x,
            float y,
            float z,
            float t ) [static], [private]
```

Definition at line 307 of file SimplexNoise.cs.

```
        {
            int h = hash & 31;      //* Convert low 5 bits of hash code into 32 simple
            float u = h < 24 ? x : y; //* gradient directions, and compute dot product.
            float v = h < 16 ? y : z;
            float w = h < 8 ? z : t;
            return ((h & 1) != 0 ? -u : u) + ((h & 2) != 0 ? -v : v) + ((h & 4) != 0 ? -w : w);
        }
```

4.9.2.9 Mod()

```
static int BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.Mod (
            int x,
            int m ) [static], [private]
```

Definition at line 277 of file SimplexNoise.cs.

```
        {
            int a = x % m;
            return a < 0 ? a + m : a;
        }
```

4.9.3 Member Data Documentation

4.9.3.1 perm

```
byte [] BeeGame.Terrain.LandGeneration.Noise.SimplexNoise.perm  [static]
```

Initial value:

```
= new byte[512] { 151,160,137,91,90,15,
              131,13,201,95,96,53,194,233,7,225,140,36,103,30,69,142,8,99,37,240,21,10,23,
              190, 6,148,247,120,234,75,0,26,197,62,94,252,219,203,117,35,11,32,57,177,33,
              88,237,149,56,87,174,20,125,136,171,168, 68,175,74,165,71,134,139,48,27,166,
              77,146,158,231,83,111,229,122,60,211,133,230,220,105,92,41,55,46,245,40,244,
              102,143,54, 65,25,63,161, 1,216,80,73,209,76,132,187,208, 89,18,169,200,196,
              135,130,116,188,159,86,164,100,109,198,173,186, 3,64,52,217,226,250,124,123,
              5,202,38,147,118,126,255,82,85,212,207,206,59,227,47,16,58,17,182,189,28,42,
              223,183,170,213,119,248,152, 2,44,154,163, 70,221,153,101,155,167, 43,172,9,
              129,22,39,253, 19,98,108,110,79,113,224,232,178,185, 112,104,218,246,97,228,
              251,34,242,193,238,210,144,12,191,179,162,241, 81,51,145,235,249,14,239,107,
              49,192,214, 31,181,199,106,157,184, 84,204,176,115,121,50,45,127, 4,150,254,
              138,236,205,93,222,114,67,29,24,72,243,141,128,195,78,66,215,61,156,180,
              151,160,137,91,90,15,
              131,13,201,95,96,53,194,233,7,225,140,36,103,30,69,142,8,99,37,240,21,10,23,
              190, 6,148,247,120,234,75,0,26,197,62,94,252,219,203,117,35,11,32,57,177,33,
              88,237,149,56,87,174,20,125,136,171,168, 68,175,74,165,71,134,139,48,27,166,
              77,146,158,231,83,111,229,122,60,211,133,230,220,105,92,41,55,46,245,40,244,
              102,143,54, 65,25,63,161, 1,216,80,73,209,76,132,187,208, 89,18,169,200,196,
              135,130,116,188,159,86,164,100,109,198,173,186, 3,64,52,217,226,250,124,123,
              5,202,38,147,118,126,255,82,85,212,207,206,59,227,47,16,58,17,182,189,28,42,
              223,183,170,213,119,248,152, 2,44,154,163, 70,221,153,101,155,167, 43,172,9,
              129,22,39,253, 19,98,108,110,79,113,224,232,178,185, 112,104,218,246,97,228,
              251,34,242,193,238,210,144,12,191,179,162,241, 81,51,145,235,249,14,239,107,
              49,192,214, 31,181,199,106,157,184, 84,204,176,115,121,50,45,127, 4,150,254,
              138,236,205,93,222,114,67,29,24,72,243,141,128,195,78,66,215,61,156,180
            }
```

Definition at line 244 of file SimplexNoise.cs.

The documentation for this class was generated from the following file:

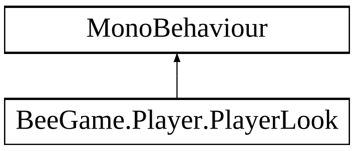
- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/LandGeneration/↩
  Noise/SimplexNoise.cs

5 Player

5.1 BeeGame.Player.PlayerLook Class Reference

The look for the player

Inheritance diagram for BeeGame.Player.PlayerLook:



Public Attributes

- Transform myTransform

  Player transfrom
- Transform cameraTransform

  Camera transfom
- float rotationLock

  Lock for camera X rotation
- float speed = 5

  Look move speed

Private Member Functions

- void Start ()

  Locks teh cursor and hides it
- void Update ()

  Every fixed update check if the look shoud be moved
- void Look ()

  Moves the look rotation

Private Attributes

- float yRot = 0

  Current Y rotation
- float xRot = 0

  Current X rotation

5.1.1 Detailed Description

The look for the player

Definition at line 9 of file PlayerLook.cs.

5.1.2 Member Function Documentation

5.1.2.1 Look()

`void BeeGame.Player.PlayerLook.Look ( ) [private]`

Moves the look rotation

Definition at line 66 of file PlayerLook.cs.

```
        {
            //Only X/Y rotation needed as Z rotation would be wierd
            yRot += Input.GetAxis("Mouse X") * speed * Time.timeScale;
            xRot -= Input.GetAxis("Mouse Y") * speed * Time.timeScale;

            //clamps the X rotation so the player camera cannot do flips
            xRot = Mathf.Clamp(xRot, -rotationLock,
rotationLock);

            myTransform.rotation = Quaternion.Euler(0, yRot, 0);
            cameraTransform.localRotation = Quaternion.Euler(xRot, 0, 0);
        }
```

5.1.2.2 Start()

```
void BeeGame.Player.PlayerLook.Start ( )  [private]
```

Locks teh cursor and hides it

Definition at line 43 of file PlayerLook.cs.

```
        {
            Cursor.lockState = CursorLockMode.Locked;
            Cursor.visible = false;
        }
```

5.1.2.3 Update()

```
void BeeGame.Player.PlayerLook.Update ( )  [private]
```

Every fixed update check if the look shoud be moved

Definition at line 52 of file PlayerLook.cs.

```
        {
            //*the look wil not update when a inventory GUI is open
            if (!THInput.isAnotherInventoryOpen)
            {
                Look();
            }
        }
```

5.1.3 Member Data Documentation

5.1.3.1 cameraTransform

```
Transform BeeGame.Player.PlayerLook.cameraTransform
```

Camera transfom

Definition at line 19 of file PlayerLook.cs.

5.1.3.2 myTransform

```
Transform BeeGame.Player.PlayerLook.myTransform
```

Player transfrom

Definition at line 15 of file PlayerLook.cs.

5.1.3.3 rotationLock

```
float BeeGame.Player.PlayerLook.rotationLock
```

Lock for camera X rotation

Definition at line 24 of file PlayerLook.cs.

5.1.3.4 speed

```
float BeeGame.Player.PlayerLook.speed = 5
```

Look move speed

Definition at line 28 of file PlayerLook.cs.

5.1.3.5 xRot

```
float BeeGame.Player.PlayerLook.xRot = 0  [private]
```

Current X rotation

Definition at line 36 of file PlayerLook.cs.

5.1.3.6 yRot

```
float BeeGame.Player.PlayerLook.yRot = 0  [private]
```

Current Y rotation

Definition at line 32 of file PlayerLook.cs.

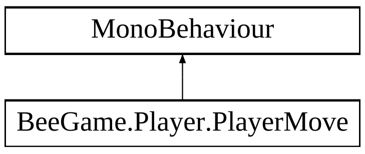
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Player/PlayerLook.cs

5.2 BeeGame.Player.PlayerMove Class Reference

Moves the player

Inheritance diagram for BeeGame.Player.PlayerMove:



Public Attributes

- float speed = 10f

  Speed of the player
- float gravity = 9.81f

  Gravity of the player
- float maxVelocity = 10f

  Max velocity of the player
- float jumpHeight = 2f

  How high can the player jump

Private Member Functions

- void Awake ()

  Gets the rigidbody and sets its variables
- void FixedUpdate ()

  Updates the player move
- void OnCollisionStay (Collision collision)

  Sets that the player can jump when it hits the ground
- void MovePlayer ()

  Moves the player
- float VerticalJumpSpeed ()

  Vertical Jump speed of the character

Private Attributes

- bool canJump = false

  Can the player jump?
- Rigidbody myRigidBody

  Rigidbody for the player

5.2.1 Detailed Description

Moves the player

Definition at line 14 of file PlayerMove.cs.

5.2.2 Member Function Documentation

5.2.2.1 Awake()

`void BeeGame.Player.PlayerMove.Awake ( ) [private]`

Gets the rigidbody and sets its variables

Definition at line 49 of file PlayerMove.cs.

```
00050         {
00051             myRigidBody = GetComponent<Rigidbody>();
00052 
00053             //i want to use myown gravity and rotation
00054             myRigidBody.useGravity = false;
00055             myRigidBody.freezeRotation = true;
00056         }
```

5.2.2.2 FixedUpdate()

`void BeeGame.Player.PlayerMove.FixedUpdate ( ) [private]`

Updates the player move

Definition at line 61 of file PlayerMove.cs.

```
00062         {
00063             //If the player is grounded it can move
00064             if (canJump)
00065             {
00066                 MovePlayer();
00067             }
00068 
00069             //adds the downward force
00070             myRigidBody.AddForce(new Vector3(0, myRigidBody.mass * -
      gravity, 0));
00071         }
```

5.2.2.3 MovePlayer()

`void BeeGame.Player.PlayerMove.MovePlayer ( ) [private]`

Moves the player

Definition at line 87 of file PlayerMove.cs.

```
00088         {
00089             //Calculate the speed we want to achive
00090             Vector3 targetVelocity = new Vector3(THInput.GetAxis("Horizontal"), 0,
      THInput.GetAxis("Vertical"));
00091             targetVelocity = transform.TransformDirection(targetVelocity);
00092             targetVelocity *= speed;
00093 
00094             //Apply a force to reach the target speed
00095             Vector3 velocity = myRigidBody.velocity;
00096             Vector3 velocityChange = (targetVelocity - velocity);
00097 
00098             //Clamping the velocity so that the player does not infinatly accelerate
00099             velocityChange.x = Mathf.Clamp(velocityChange.x, -maxVelocity,
      maxVelocity);
00100             velocityChange.z = Mathf.Clamp(velocityChange.z, -maxVelocity,
      maxVelocity);
00101             velocityChange.y = 0;
00102 
00103             //Adds the force to the player so they move in the correct direction
00104             myRigidBody.AddForce(velocityChange, ForceMode.Impulse);
00105 
00106             //Jumping
00107             if (canJump && THInput.GetButton("Jump"))
00108             {
00109                 canJump = false;
00110                 myRigidBody.velocity = new Vector3(velocity.x,
      VerticalJumpSpeed(), velocity.z);
00111             }
00112         }
```

5.2.2.4 OnCollisionStay()

```
void BeeGame.Player.PlayerMove.OnCollisionStay (
            Collision collision )  [private]
```

Sets that the player can jump when it hits the ground

Parameters

collision	What the player hit

Definition at line 77 of file PlayerMove.cs.

```
        {
            canJump = true;
        }
```

5.2.2.5 VerticalJumpSpeed()

```
float BeeGame.Player.PlayerMove.VerticalJumpSpeed ( )  [private]
```

Vertical Jump speed of the character

Returns

Speed of the jump

Definition at line 118 of file PlayerMove.cs.

```
        {
            //*Gets the correct of fore required for the player to reach the desired apex
            //*Can this be done without Square Root as that take alot of work?
            return Mathf.Sqrt(2 * jumpHeight * gravity);
        }
```

5.2.3 Member Data Documentation

5.2.3.1 canJump

```
bool BeeGame.Player.PlayerMove.canJump = false  [private]
```

Can the player jump?

Definition at line 33 of file PlayerMove.cs.

5.2.3.2 gravity

```
float BeeGame.Player.PlayerMove.gravity = 9.81f
```

Gravity of the player

Definition at line 24 of file PlayerMove.cs.

5.2.3.3 jumpHeight

```
float BeeGame.Player.PlayerMove.jumpHeight = 2f
```

How high can the player jump

Definition at line 37 of file PlayerMove.cs.

5.2.3.4 maxVelocity

```
float BeeGame.Player.PlayerMove.maxVelocity = 10f
```

Max velocity of the player

Definition at line 28 of file PlayerMove.cs.

5.2.3.5 myRigidBody

```
Rigidbody BeeGame.Player.PlayerMove.myRigidBody  [private]
```

Rigidbody for the player

Definition at line 42 of file PlayerMove.cs.

5.2.3.6 speed

```
float BeeGame.Player.PlayerMove.speed = 10f
```

Speed of the player

Definition at line 20 of file PlayerMove.cs.

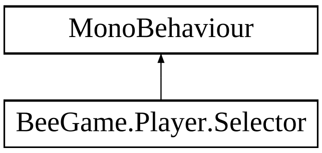
The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Player/PlayerMove.cs

5.3 BeeGame.Player.Selector Class Reference

Moves the Block selector

Inheritance diagram for BeeGame.Player.Selector:



Public Attributes

- GameObject selector

  Selector
- LayerMask layers

  Layers for the selector to look at
- int selectedHotbarSlot = 27

  What slot in the hotbar is selected

Private Member Functions

- void Awake ()

  Make the selector
- void FixedUpdate ()

  Updates the selector if an inventory is not open
- void Update ()

  Breaks and places a Block if an inventory is no open
- void UpdateSelector ()

  Updates teh selectors position
- void SelectedSlot ()

  Chanages what slot in the hotbar is currently selected by the player
- void BreakBlock ()

  Breaks the Block in the selectors postion
- void PlaceBlock ()

  Places s Block in the selector postion

Private Attributes

- RaycastHit hit

  Where the raycast hit

5.3.1 Detailed Description

Moves the Block selector

Definition at line 14 of file Selector.cs.

5.3.2 Member Function Documentation

5.3.2.1 Awake()

`void BeeGame.Player.Selector.Awake ( )  [private]`

Make the selector

Definition at line 41 of file Selector.cs.

```
        {
            selector = Instantiate(selector);
        }
```

5.3.2.2 BreakBlock()

`void BeeGame.Player.Selector.BreakBlock ( )  [private]`

Breaks the Block in the selectors postion

Definition at line 117 of file Selector.cs.

```
        {
            Chunk chunk = GetChunk(selector.transform.position);

            Block block = chunk.world.GetBlock((int)selector.transform.position.x, (int)
      selector.transform.position.y, (int)selector.transform.position.z);

            if (!block.breakable)
                return;

            chunk.SetBlock((int)selector.transform.position.x, (int)
      selector.transform.position.y, (int)selector.transform.position.z, new
      Air(), true);
            //* set to changed so when block is placed down again it will be saved
            block.changed = true;
            block.BreakBlock(selector.transform.position);
        }
```

5.3.2.3 FixedUpdate()

`void BeeGame.Player.Selector.FixedUpdate ( )  [private]`

Updates the selector if an inventory is not open

Definition at line 49 of file Selector.cs.

```
        {
            if(!isAnotherInventoryOpen)
                UpdateSelector();
        }
```

5.3.2.4 PlaceBlock()

`void BeeGame.Player.Selector.PlaceBlock ( )  [private]`

Places s Block in the selector postion

Definition at line 135 of file Selector.cs.

```
00136         {
00137             Chunk chunk = GetChunk(selector.transform.position);
00138 
00139             if (chunk == null)
00140                 return;
00141 
00142             //* gets the item in the hotbar and if the item is placeable place it
00143             if(transform.parent.GetComponentInChildren<PlayerInventory>().
      GetItemFromHotBar(selectedHotbarSlot, out
      Item blockToPlace))
00144                 chunk.world.SetBlock((int)(selector.transform.position.x +
      hit.normal.x), (int)(selector.transform.position.y + hit.normal.y), (int)(
      selector.transform.position.z + hit.normal.z), (Block)blockToPlace, true);
00145         }
```

5.3.2.5 SelectedSlot()

`void BeeGame.Player.Selector.SelectedSlot ( )  [private]`

Chanages what slot in the hotbar is currently selected by the player

Definition at line 92 of file Selector.cs.

```
00093         {
00094             //* adds 1 to the selected slot and if that is out of range set it to the first hotbar slot
00095             if(Input.GetAxis("Mouse ScrollWheel") > 0)
00096             {
00097                 selectedHotbarSlot += 1;
00098                 if (selectedHotbarSlot == 36)
00099                     selectedHotbarSlot = 27;
00100             }
00101             //* removes one from the hotbar selector and if the selector would be inside the inventory set
       it to the last slot in the hotbar
00102             else if (Input.GetAxis("Mouse ScrollWheel") < 0)
00103             {
00104                 selectedHotbarSlot -= 1;
00105                 if (selectedHotbarSlot == 26)
00106                     selectedHotbarSlot = 35;
00107             }
00108 
00109             transform.parent.GetComponentInChildren<PlayerInventory>().
      SelectedSlot(selectedHotbarSlot);
00110         }
```

5.3.2.6 Update()

`void BeeGame.Player.Selector.Update ( )  [private]`

Breaks and places a Block if an inventory is no open

Definition at line 58 of file Selector.cs.

```
00059         {
00060             if (!isAnotherInventoryOpen)
00061             {
00062                 if (GetButtonDown("Break Block"))
00063                     BreakBlock();
00064                 if (GetButtonDown("Place"))
00065                     PlaceBlock();
00066             }
00067         }
```

5.3.2.7 UpdateSelector()

`void BeeGame.Player.Selector.UpdateSelector ( )  [private]`

Updates teh selectors position

Definition at line 74 of file Selector.cs.

```
        {
            if (Physics.Raycast(transform.position, transform.forward, out hit, 15,
      layers))
            {
                selector.SetActive(true);
                selector.transform.position = GetBlockPos(hit);
                //*selector.SetActive(BlockInPosition(GetBlockPos(hit),
       hit.collider.GetComponent<Chunk>()));
            }
            else
            {
                selector.SetActive(false);
            }
            SelectedSlot();
        }
```

5.3.3 Member Data Documentation

5.3.3.1 hit

`RaycastHit BeeGame.Player.Selector.hit  [private]`

Where the raycast hit

Definition at line 29 of file Selector.cs.

5.3.3.2 layers

`LayerMask BeeGame.Player.Selector.layers`

Layers for the selector to look at

Definition at line 25 of file Selector.cs.

5.3.3.3 selectedHotbarSlot

`int BeeGame.Player.Selector.selectedHotbarSlot = 27`

What slot in the hotbar is selected

Definition at line 34 of file Selector.cs.

5.3.3.4 selector

```
GameObject BeeGame.Player.Selector.selector
```

Selector

Definition at line 20 of file Selector.cs.

The documentation for this class was generated from the following file:

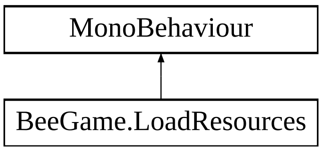
- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Player/Selector.cs

6 Resources

6.1 BeeGame.LoadResources Class Reference

Loads all of the resources in the game

Inheritance diagram for BeeGame.LoadResources:



Private Member Functions

- void Awake ()
    Loads the sprites and prefab dictionarys

6.1.1 Detailed Description

Loads all of the resources in the game

Definition at line 9 of file LoadResources.cs.

6.1.2 Member Function Documentation

6.1.2.1 Awake()

```
void BeeGame.LoadResources.Awake ( )  [private]
```

Loads the sprites and prefab dictionarys

Definition at line 14 of file LoadResources.cs.

```
        {
            Serialization.Serialization.MakeDirectorys();
            SpriteDictionary.LoadSprites();
            PrefabDictionary.LoadPrefabs();
        }
```

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/LoadResources.cs

6.2 BeeGame.Core.PrefabDictionary Class Reference

The prefabs avaliable to the game

Static Public Member Functions

- static void LoadPrefabs ()

  Loads the prefabs into the Dictionary
- static GameObject GetPrefab (string prefab)

  Returns a GameObject in the prefab dictionary

Static Private Attributes

- static Dictionary< string, GameObject > prefabDictionary = new Dictionary<string, GameObject>()

  All of the prefabs avaliable to spawn in

6.2.1 Detailed Description

The prefabs avaliable to the game

Definition at line 9 of file PrefabDictionary.cs.

6.2.2 Member Function Documentation

6.2.2.1 GetPrefab()

```
static GameObject BeeGame.Core.PrefabDictionary.GetPrefab (
              string prefab )  [static]
```

Returns a GameObject in the prefab dictionary

Parameters

prefab	Name of th prefab to get

Returns

Prefab of the given name

Definition at line 29 of file PrefabDictionary.cs.

```
        {
            return prefabDictionary[prefab];
        }
```

6.2.2.2 LoadPrefabs()

`static void BeeGame.Core.PrefabDictionary.LoadPrefabs ( )  [static]`

Loads the prefabs into the Dictionary

Definition at line 19 of file PrefabDictionary.cs.

```
        {
            prefabDictionary = Resources.Resources.GetPrefabs();
        }
```

6.2.3 Member Data Documentation

6.2.3.1 prefabDictionary

`Dictionary<string, GameObject> BeeGame.Core.PrefabDictionary.prefabDictionary = new Dictionary<string, GameObject>()  [static], [private]`

All of the prefabs avaliable to spawn in

Definition at line 14 of file PrefabDictionary.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/PrefabDictionary.cs

6.3 BeeGame.Core.SpriteDictionary Class Reference

All of the sprites avaliable to the game

Static Public Member Functions

- static Sprite GetSprite (string spriteName)
  Get a sprite of the given name
- static void LoadSprites ()
  Loads the sprites into the dictionary

Static Private Attributes

- static Dictionary< string, Sprite > itemSpriteDictionary = new Dictionary<string, Sprite>()
  All of the sprites avaliable to spawn in

6.3.1 Detailed Description

All of the sprites avaliable to the game

Definition at line 9 of file SpriteDictionary.cs.

6.3.2 Member Function Documentation

6.3.2.1 GetSprite()

```
static Sprite BeeGame.Core.SpriteDictionary.GetSprite (
              string spriteName )  [static]
```

Get a sprite of the given name

Parameters

spriteName	Name of sprite to get

Returns

A sprite of the given name, null if no sprite of that name exists

Definition at line 21 of file SpriteDictionary.cs.

```
        {
            itemSpriteDictionary.TryGetValue(spriteName, out Sprite sprite);

            if (sprite == null)
                return new Sprite();

            return sprite;
        }
```

6.3.2.2 LoadSprites()

`static void BeeGame.Core.SpriteDictionary.LoadSprites ( )  [static]`

Loads the sprites into the dictionary

Definition at line 34 of file SpriteDictionary.cs.

```
        {
            itemSpriteDictionary = Resources.Resources.GetSprites();
        }
```

6.3.3 Member Data Documentation

6.3.3.1 itemSpriteDictionary

`Dictionary<string, Sprite> BeeGame.Core.SpriteDictionary.itemSpriteDictionary = new Dictionary<string, Sprite>()  [static], [private]`

All of the sprites avaliable to spawn in

Definition at line 14 of file SpriteDictionary.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/SpriteDictionary.cs

6.4 BeeGame.Resources.Resources Class Reference

A strongly-typed resource class, for looking up localized strings, etc.

Package Functions

- Resources ()

Static Package Functions

- static Dictionary< string, Sprite > GetSprites ()
- static Dictionary< string, GameObject > GetPrefabs ()

Properties

- static global::System.Resources.ResourceManager ResourceManager `[get]`

    Returns the cached ResourceManager instance used by this class.
- static global::System.Globalization.CultureInfo Culture `[get, set]`

    Overrides the current thread's CurrentUICulture property for all resource lookups using this strongly typed resource class.
- static byte [ ] Prefabs `[get]`

    Looks up a localized resource of type System.Byte[].
- static byte [ ] Sprites `[get]`

    Looks up a localized resource of type System.Byte[].

Static Private Attributes

- static global::System.Resources.ResourceManager resourceMan
- static global::System.Globalization.CultureInfo resourceCulture

6.4.1 Detailed Description

A strongly-typed resource class, for looking up localized strings, etc.

Definition at line 26 of file Resources.Designer.cs.

6.4.2 Constructor & Destructor Documentation

6.4.2.1 Resources()

```
BeeGame.Resources.Resources.Resources ( )  [package]
```

Definition at line 33 of file Resources.Designer.cs.

```
00033                               {
00034         }
```

6.4.3 Member Function Documentation

6.4.3.1 GetPrefabs()

```
static Dictionary<string, GameObject> BeeGame.Resources.Resources.GetPrefabs ( )  [static],
[package]
```

Definition at line 118 of file Resources.Designer.cs.

```
00119         {
00120             string[] splitCharacters = new string[] { "," };
00121             object obj = ResourceManager.GetObject("Prefabs",
      resourceCulture);
00122 
00123             string text = System.Text.Encoding.Default.GetString((byte[])obj);
00124             text = text.Remove(0, 3);
00125             string lineText = "";
00126             string[] splitText;
00127             Dictionary<string, GameObject> objects = new Dictionary<string, GameObject>();
00128 
00129             for (int i = 0; i < text.Length; i++)
00130             {
00131                 if(text[i] != '\n')
00132                 {
00133                     lineText += text[i];
00134                 }
00135                 else
00136                 {
00137                     splitText = lineText.Split(splitCharacters, StringSplitOptions.RemoveEmptyEntries);
00138                     lineText = "";
00139                     objects.Add(splitText[0], UnityEngine.Resources.Load("Prefabs/" + splitText[
      1]) as GameObject);
00140                 }
00141             }
00142 
00143             splitText = lineText.Split(splitCharacters, StringSplitOptions.RemoveEmptyEntries);
00144             lineText = "";
00145             objects.Add(splitText[0], UnityEngine.Resources.Load("Prefabs/" + splitText[1]) as
      GameObject);
00146 
00147             return objects;
00148         }
```

6.4.3.2 GetSprites()

```
static Dictionary<string, Sprite> BeeGame.Resources.Resources.GetSprites ( )  [static], [package]
```

Definition at line 84 of file Resources.Designer.cs.

```
        {
            string[] splitCharacters = new string[] { "," };
            object obj = ResourceManager.GetObject("Sprites",
      resourceCulture);

            string text = System.Text.Encoding.Default.GetString((byte[])obj);
            string lineText = "";
            string[] splitText;
            Texture2D tex;
            Dictionary<string, Sprite> sprites = new Dictionary<string, Sprite>();

            for (int i = 0; i < text.Length; i++)
            {
                if (text[i] != '\n')
                {
                    lineText += text[i];
                }
                else
                {
                    splitText = lineText.Split(splitCharacters, StringSplitOptions.RemoveEmptyEntries);
                    lineText = "";
                    tex = UnityEngine.Resources.Load("Sprites/" + splitText[1]) as Texture2D;
                    sprites.Add(splitText[0], Sprite.Create(tex, new UnityEngine.Rect(0, 0, tex.
      width, tex.height), Vector2.zero));
                }
            }

            splitText = lineText.Split(splitCharacters, StringSplitOptions.RemoveEmptyEntries);
            lineText = "";
            tex = UnityEngine.Resources.Load("Sprites/" + splitText[1]) as Texture2D;
            sprites.Add(splitText[0], Sprite.Create(tex, new UnityEngine.Rect(0, 0, tex.width,
      tex.height), Vector2.zero));

            return sprites;
        }
```

6.4.4 Member Data Documentation

6.4.4.1 resourceCulture

```
global.System.Globalization.CultureInfo BeeGame.Resources.Resources.resourceCulture  [static],
[private]
```

Definition at line 30 of file Resources.Designer.cs.

6.4.4.2 resourceMan

```
global.System.Resources.ResourceManager BeeGame.Resources.Resources.resourceMan  [static],
[private]
```

Definition at line 28 of file Resources.Designer.cs.

6.4.5 Property Documentation

6.4.5.1 Culture

```
global.System.Globalization.CultureInfo BeeGame.Resources.Resources.Culture  [static], [get],
[set], [package]
```

Overrides the current thread's CurrentUICulture property for all resource lookups using this strongly typed resource class.

Definition at line 55 of file Resources.Designer.cs.

6.4.5.2 Prefabs

```
byte [] BeeGame.Resources.Resources.Prefabs  [static], [get], [package]
```

Looks up a localized resource of type System.Byte[].

Definition at line 67 of file Resources.Designer.cs.

6.4.5.3 ResourceManager

```
global.System.Resources.ResourceManager BeeGame.Resources.Resources.ResourceManager  [static],
[get], [package]
```

Returns the cached ResourceManager instance used by this class.

Definition at line 40 of file Resources.Designer.cs.

6.4.5.4 Sprites

```
byte [] BeeGame.Resources.Resources.Sprites  [static], [get], [package]
```

Looks up a localized resource of type System.Byte[].

Definition at line 77 of file Resources.Designer.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Resources/Resources.↩
Designer.cs

7 Unity Type & Method Replacements

7.1 BeeGame.Core.THInput Class Reference

My implementation of the unity input system. Acts as a buffer layer to the unity system so that the input keys can be changed at runtime

Static Public Member Functions

- static bool GetButtonDown (string button)

  Has the given button been pressed this update
- static bool GetButton (string button)

  Is the given button currently being held down
- static bool GetButtonUp (string button)

  Has the given button been relesed this update
- static int GetAxis (string axis)

  Gets the axis of a button press

Static Public Attributes

- static bool isAnotherInventoryOpen

  If another inventory is open true, else false

Static Private Attributes

- static Dictionary< string, object > inputButtons

  Button identifiers and KeyCode

7.1.1 Detailed Description

My implementation of the unity input system. Acts as a buffer layer to the unity system so that the input keys can be changed at runtime

Definition at line 10 of file THInput.cs.

7.1.2 Member Function Documentation

7.1.2.1 GetAxis()

```
static int BeeGame.Core.THInput.GetAxis (
              string axis )  [static]
```

Gets the axis of a button press

Parameters

axis	Axis to check, Horizontal or Vertical

Returns

+1 or -1

Definition at line 130 of file THInput.cs.

```
        {
            int returnAxis = 0;

            if (axis == "Horizontal")
            {
                if (GetButton("Right"))
                {
                    returnAxis += 1;
                }

                if (GetButton("Left"))
                {
                    returnAxis -= 1;
                }
            }
            else if (axis == "Vertical")
            {
                if (GetButton("Forward"))
                {
                    returnAxis += 1;
                }

                if (GetButton("Backward"))
                {
                    returnAxis -= 1;
                }
            }

            return returnAxis;
        }
```

7.1.2.2 GetButton()

```
static bool BeeGame.Core.THInput.GetButton (
             string button )  [static]
```

Is the given button currently being held down

Parameters

button	The button name eg "Forward"

Returns

true if the given button is currently being held down

Definition at line 70 of file THInput.cs.

```
        {
            if (!inputButtons.ContainsKey(button))
            {
                throw new Exception("Input Manager: Key button name not defined: " + button);
            }

            switch (inputButtons[button])
            {
                case KeyCode[] arry:
                    //*for each posible key, check if it was pressed and if it was return that it was, if
    none of them was poressed return false
                    foreach (var item in arry)
                    {
                        if (Input.GetKey(item))
                        {
                            return true;
                        }
                    }

                    return false;
                default:
                    return Input.GetKey((KeyCode)inputButtons[button]);
            }
        }
```

7.1.2.3 GetButtonDown()

```
static bool BeeGame.Core.THInput.GetButtonDown (
            string button )  [static]
```

Has the given button been pressed this update

Parameters

button	The button name eg "Inventory"

Returns

true if the given button has been pressed this update

Definition at line 40 of file THInput.cs.

```
        {
            if (!inputButtons.ContainsKey(button))
            {
                throw new Exception("Input Manager: Key button name not defined: " + button);
            }

            switch (inputButtons[button])
            {
                case KeyCode[] arry:
                    //*for each posible key, check if it was pressed and if it was return that it was, if
      none of them was poressed return false
                    foreach (var item in arry)
                    {
                        if (Input.GetKeyDown(item))
                        {
                            return true;
                        }
                    }

                    return false;
                default:
                    return Input.GetKeyDown((KeyCode)inputButtons[button]);
            }
        }
```

7.1.2.4 GetButtonUp()

```
static bool BeeGame.Core.THInput.GetButtonUp (
            string button )  [static]
```

Has the given button been relesed this update

Parameters

button	Button name eg "Inventory"

Returns

true if the button has been relesed during this update

Definition at line 100 of file THInput.cs.

```
        {
            if (!inputButtons.ContainsKey(button))
            {
                throw new Exception("Input Manager: Key button name not defined: " + button);
            }

            switch (inputButtons[button])
            {
                case KeyCode[] arry:
                    //*for each posible key, check if it was pressed and if it was return that it was, if
       none of them was poressed return false
                    foreach (var item in arry)
                    {
                        if (Input.GetKeyUp(item))
                        {
                            return true;
                        }
                    }

                    return false;
                default:
                    return Input.GetKeyUp((KeyCode)inputButtons[button]);
            }
        }
```

7.1.3 Member Data Documentation

7.1.3.1 inputButtons

```
Dictionary<string, object> BeeGame.Core.THInput.inputButtons  [static], [private]
```

Initial value:

```
= new Dictionary<string, object>()
        {
            {"Forward" , KeyCode.W},
            {"Backward", KeyCode.S },
            {"Right", KeyCode.D },
            {"Left", KeyCode.A },
            {"Player Inventory", KeyCode.E },
            {"Quest Book", KeyCode.Mouse1 },
            {"Interact", KeyCode.Mouse1 },
            {"Place", KeyCode.Mouse1 },
            {"Break Block", KeyCode.Mouse0 },
            {"Close Menu/Inventory", new KeyCode[2] { KeyCode.Escape, KeyCode.E } },
            {"Jump", KeyCode.Space }
        }
```

Button identifiers and KeyCode

Definition at line 15 of file THInput.cs.

7.1.3.2 isAnotherInventoryOpen

```
bool BeeGame.Core.THInput.isAnotherInventoryOpen  [static]
```

If another inventory is open true, else false

Definition at line 33 of file THInput.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/UnityTypeReplacements/T↩ HInput.cs

7.2 BeeGame.Core.THVector2 Struct Reference

Serilializable version of Vector2

Public Member Functions

- THVector2 (float x, float y)

    Constructor from 2 floats
- THVector2 (THVector2 vec2)

    Constructor from another THVector2
- THVector2 (Vector2 vec2)

    Constructor from Vector2
- override bool Equals (object obj)
- override int GetHashCode ()
- override string ToString ()

Static Public Member Functions

- static bool operator== (THVector2 a, THVector2 b)
- static bool operator!= (THVector2 a, THVector2 b)
- static THVector2 operator+ (THVector2 a, THVector2 b)
- static THVector2 operator+ (THVector2 a, float b)
- static THVector2 operator+ (float a, THVector2 b)
- static THVector2 operator- (THVector2 a, THVector2 b)
- static THVector2 operator- (THVector2 a, float b)
- static THVector2 operator- (float a, THVector2 b)
- static THVector2 operator∗ (THVector2 a, THVector2 b)
- static THVector2 operator∗ (THVector2 a, float b)
- static THVector2 operator∗ (float a, THVector2 b)
- static THVector2 operator/ (THVector2 a, THVector2 b)
- static THVector2 operator/ (THVector2 a, float b)
- static THVector2 operator/ (float a, THVector2 b)
- static implicit operator Vector2 (THVector2 vec2)
- static implicit operator THVector2 (Vector2 vec2)

Public Attributes

- float x

  X position
- float y

  Y position

7.2.1 Detailed Description

Serilializable version of Vector2

Definition at line 10 of file THVector2.cs.

7.2.2 Constructor & Destructor Documentation

7.2.2.1 THVector2() [1/3]

```
BeeGame.Core.THVector2.THVector2 (
            float x,
            float y )
```

Constructor from 2 floats

Parameters

x	X position
y	Y position

Definition at line 29 of file THVector2.cs.

```
        {
            this.x = x;
            this.y = y;
        }
```

7.2.2.2 THVector2() [2/3]

```
BeeGame.Core.THVector2.THVector2 (
            THVector2 vec2 )
```

Constructor from another THVector2

Parameters

vec2	Vector to make this from

Definition at line 39 of file THVector2.cs.

```
        {
            this = vec2;
        }
```

7.2.2.3 THVector2() [3/3]

```
BeeGame.Core.THVector2.THVector2 (
            Vector2 vec2 )
```

Constructor from Vector2

Parameters

vec2	Vector to make this from

Definition at line 48 of file THVector2.cs.

```
        {
            this = vec2;
        }
```

7.2.3 Member Function Documentation

7.2.3.1 Equals()

```
override bool BeeGame.Core.THVector2.Equals (
            object obj )
```

Definition at line 55 of file THVector2.cs.

```
        {
            if (!(obj is THVector2))
                return false;
            if (obj.GetHashCode() == GetHashCode())
                return true;
            return false;
        }
```

7.2.3.2 GetHashCode()

```
override int BeeGame.Core.THVector2.GetHashCode ( )
```

Definition at line 64 of file THVector2.cs.

```
        {
            unchecked
            {
                int hash = 13;

                hash *= 443 * x.GetHashCode();
                hash *= 373 * y.GetHashCode();

                return hash;
            }
        }
```

7.2.3.3 operator THVector2()

```
static implicit BeeGame.Core.THVector2.operator THVector2 (
              Vector2 vec2 )  [static]
```

Definition at line 171 of file THVector2.cs.

```
            {
                return new THVector2(vec2.x, vec2.y);
            }
```

7.2.3.4 operator Vector2()

```
static implicit BeeGame.Core.THVector2.operator Vector2 (
              THVector2 vec2 )  [static]
```

Definition at line 166 of file THVector2.cs.

```
            {
                return new Vector2(vec2.x, vec2.y);
            }
```

7.2.3.5 operator"!=()

```
static bool BeeGame.Core.THVector2.operator!= (
              THVector2 a,
              THVector2 b )  [static]
```

Definition at line 86 of file THVector2.cs.

```
            {
                return !(a == b);
            }
```

7.2.3.6 operator*() [1/3]

```
static THVector2 BeeGame.Core.THVector2.operator* (
              THVector2 a,
              THVector2 b )  [static]
```

Definition at line 127 of file THVector2.cs.

```
            {
                a.x *= b.x;
                a.y *= b.y;

                return a;
            }
```

7.2.3.7 operator*() [2/3]

```
static THVector2 BeeGame.Core.THVector2.operator* (
              THVector2 a,
              float b )  [static]
```

Definition at line 134 of file THVector2.cs.

```
        {
            a.x *= b;
            a.y *= b;

            return a;
        }
```

7.2.3.8 operator*() [3/3]

```
static THVector2 BeeGame.Core.THVector2.operator* (
              float a,
              THVector2 b )  [static]
```

Definition at line 141 of file THVector2.cs.

```
        {
            return new THVector2(a * b.x, a * b.y);
        }
```

7.2.3.9 operator+() [1/3]

```
static THVector2 BeeGame.Core.THVector2.operator+ (
              THVector2 a,
              THVector2 b )  [static]
```

Definition at line 91 of file THVector2.cs.

```
        {
            a.x += b.x;
            a.y += b.y;

            return a;
        }
```

7.2.3.10 operator+() [2/3]

```
static THVector2 BeeGame.Core.THVector2.operator+ (
              THVector2 a,
              float b )  [static]
```

Definition at line 98 of file THVector2.cs.

```
        {
            a.x += b;
            a.y += b;

            return a;
        }
```

7.2.3.11 operator+() [3/3]

```
static THVector2 BeeGame.Core.THVector2.operator+ (
            float a,
            THVector2 b ) [static]
```

Definition at line 105 of file THVector2.cs.

```
        {
            return new THVector2(a + b.x, a + b.y);
        }
```

7.2.3.12 operator-() [1/3]

```
static THVector2 BeeGame.Core.THVector2.operator- (
            THVector2 a,
            THVector2 b ) [static]
```

Definition at line 109 of file THVector2.cs.

```
        {
            a.x -= b.x;
            a.y -= b.y;

            return a;
        }
```

7.2.3.13 operator-() [2/3]

```
static THVector2 BeeGame.Core.THVector2.operator- (
            THVector2 a,
            float b ) [static]
```

Definition at line 116 of file THVector2.cs.

```
        {
            a.x += b;
            a.y += b;

            return a;
        }
```

7.2.3.14 operator-() [3/3]

```
static THVector2 BeeGame.Core.THVector2.operator- (
            float a,
            THVector2 b ) [static]
```

Definition at line 123 of file THVector2.cs.

```
        {
            return new THVector2(a - b.x, a - b.y);
        }
```

7.2.3.15 operator/() [1/3]

```
static THVector2 BeeGame.Core.THVector2.operator/ (
            THVector2 a,
            THVector2 b )  [static]
```

Definition at line 145 of file THVector2.cs.

```
{
    a.x /= b.x;
    a.y /= b.y;

    return a;
}
```

7.2.3.16 operator/() [2/3]

```
static THVector2 BeeGame.Core.THVector2.operator/ (
            THVector2 a,
            float b )  [static]
```

Definition at line 152 of file THVector2.cs.

```
{
    a.x /= b;
    a.y /= b;

    return a;
}
```

7.2.3.17 operator/() [3/3]

```
static THVector2 BeeGame.Core.THVector2.operator/ (
            float a,
            THVector2 b )  [static]
```

Definition at line 159 of file THVector2.cs.

```
{
    return new THVector2(a / b.x, a / b.y);
}
```

7.2.3.18 operator==()

```
static bool BeeGame.Core.THVector2.operator== (
            THVector2 a,
            THVector2 b )  [static]
```

Definition at line 82 of file THVector2.cs.

```
{
    return a.Equals(b);
}
```

7.2.3.19 ToString()

```
override string BeeGame.Core.THVector2.ToString ( )
```

Definition at line 77 of file THVector2.cs.

```
00078         {
00079             return $"{x}, {y}";
00080         }
```

7.2.4 Member Data Documentation

7.2.4.1 x

```
float BeeGame.Core.THVector2.x
```

X position

Definition at line 16 of file THVector2.cs.

7.2.4.2 y

```
float BeeGame.Core.THVector2.y
```

Y position

Definition at line 20 of file THVector2.cs.

The documentation for this struct was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/UnityTypeReplacements/T←
HVector2.cs

7.3 BeeGame.Core.THVector3 Struct Reference

Serializable version of Vector3

Public Member Functions

- THVector3 (float x, float y, float z)

  Constructor from 3 floats
- THVector3 (THVector3 vec3)

  Constructor from another THVector3
- THVector3 (Vector3 vec3)

  Constructor from another Vector3
- THVector3 (Terrain.ChunkWorldPos vec3)

  Constructor from another Terrain.ChunkWorldPos
- override bool Equals (object obj)

  This this vector == to another
- override int GetHashCode ()

  Gets the hascode for the vector
- override string ToString ()

  Formats the vector as a nice string

Static Public Member Functions

- static float Distance (THVector3 a, THVector3 b)

  Distance between 2 vectors
- static bool operator== (THVector3 a, THVector3 b)

  Checks if a == b
- static bool operator!= (THVector3 a, THVector3 b)

  Inverse of ==
- static THVector3 operator+ (THVector3 a, THVector3 b)

  Adds vector a and b
- static THVector3 operator+ (THVector3 a, float b)

  Adds b to vector a
- static THVector3 operator+ (float a, THVector3 b)

  Adds a to vector b
- static THVector3 operator- (THVector3 a, THVector3 b)

  Subtracs vector a and b
- static THVector3 operator- (THVector3 a, float b)

  Subtracts b from vector a
- static THVector3 operator- (float a, THVector3 b)

  Subtracts a from vector b
- static THVector3 operator∗ (THVector3 a, THVector3 b)

  Multiplies vector a and b
- static THVector3 operator∗ (THVector3 a, float b)

  Multiples b to vector a
- static THVector3 operator∗ (float a, THVector3 b)

  Multiples a to vector b
- static THVector3 operator/ (THVector3 a, THVector3 b)

  Divides vector a and b
- static THVector3 operator/ (THVector3 a, float b)

  Divides a by b
- static THVector3 operator/ (float a, THVector3 b)

  Divides b by a
- static implicit operator Vector3 (THVector3 vec3)

  Converts THVector3 to Vector3 implicetly
- static implicit operator THVector3 (Vector3 vec3)

  Converts Vector3 to THVector3 implicetly

Public Attributes

- float x

  X position
- float y

  Y postion
- float z

  Z position

7.3.1 Detailed Description

Serializable version of Vector3

Definition at line 10 of file THVector3.cs.

7.3.2 Constructor & Destructor Documentation

7.3.2.1 THVector3() [1/4]

```
BeeGame.Core.THVector3.THVector3 (
              float x,
              float y,
              float z )
```

Constructor from 3 floats

Parameters

x	X position
y	Y position
z	Z position

Definition at line 34 of file THVector3.cs.

```
        {
            this.x = x;
            this.y = y;
            this.z = z;
        }
```

7.3.2.2 THVector3() [2/4]

```
BeeGame.Core.THVector3.THVector3 (
              THVector3 vec3 )
```

Constructor from another THVector3

Parameters

vec3	Vector to make this from

Definition at line 45 of file THVector3.cs.

```
        {
            this = vec3;
        }
```

7.3.2.3 THVector3() [3/4]

```
BeeGame.Core.THVector3.THVector3 (
              Vector3 vec3 )
```

Constructor from another Vector3

Parameters

vec3	Vector to make this from

Definition at line 54 of file THVector3.cs.

```
        {
            this = vec3;
        }
```

7.3.2.4 THVector3() [4/4]

```
BeeGame.Core.THVector3.THVector3 (
            Terrain.ChunkWorldPos vec3 )
```

Constructor from another Terrain.ChunkWorldPos

Parameters

vec3	Vector to make this from

Definition at line 63 of file THVector3.cs.

```
        {
            this = vec3;
        }
```

7.3.3 Member Function Documentation

7.3.3.1 Distance()

```
static float BeeGame.Core.THVector3.Distance (
            THVector3 a,
            THVector3 b )  [static]
```

Distance between 2 vectors

Parameters

a	First Vector
b	Second Vector

Returns

Distance between *a* and *b*

Definition at line 76 of file THVector3.cs.

```
        {
            return (float)Math.Sqrt(Math.Pow((a.x - b.x), 2) + Math.Pow((a.y - b.y), 2) + Math.Pow((a.z - b
    .z), 2));
        }
```

7.3.3.2 Equals()

`override bool BeeGame.Core.THVector3.Equals ( object obj )`

This this vector == to another

Parameters

obj	object to check against

Returns

Definition at line 88 of file THVector3.cs.

```
        {
            if (!(obj is THVector3))
                return false;
            if (obj.GetHashCode() == GetHashCode())
                return true;
            return false;
        }
```

7.3.3.3 GetHashCode()

`override int BeeGame.Core.THVector3.GetHashCode ( )`

Gets the hascode for the vector

Returns

Definition at line 101 of file THVector3.cs.

```
        {
            unchecked
            {
                int hash = 13;

                hash *= 443 * x.GetHashCode();
                hash *= 373 * y.GetHashCode();
                hash *= 127 * z.GetHashCode();

                return hash;
            }
        }
```

7.3.3.4 operator THVector3()

`static implicit BeeGame.Core.THVector3.operator THVector3 ( Vector3 vec3 ) [static]`

Converts Vector3 to THVector3 implicetly

Parameters

vec3	Vector to convert

Definition at line 313 of file THVector3.cs.

```
        {
            return new THVector3(vec3.x, vec3.y, vec3.z);
        }
```

7.3.3.5 operator Vector3()

```
static implicit BeeGame.Core.THVector3.operator Vector3 (
            THVector3 vec3 )  [static]
```

Converts THVector3 to Vector3 implicetly

Parameters

vec3	Vector to convert

Definition at line 304 of file THVector3.cs.

```
        {
            return new Vector3(vec3.x, vec3.y, vec3.z);
        }
```

7.3.3.6 operator"!=()

```
static bool BeeGame.Core.THVector3.operator!= (
            THVector3 a,
            THVector3 b )  [static]
```

Inverse of ==

Parameters

a	First vector
b	Second vector

Returns

true if *a* != *b*

Definition at line 140 of file THVector3.cs.

```
{
    return !(a == b);
}
```

7.3.3.7 operator*() [1/3]

```
static THVector3 BeeGame.Core.THVector3.operator* (
            THVector3 a,
            THVector3 b )  [static]
```

Multiplies vector a and b

Parameters

a	Vector a
b	Vector b

Returns

returns new vector that is the product of a and b

Definition at line 227 of file THVector3.cs.

```
{
    a.x *= b.x;
    a.y *= b.y;
    a.z *= b.z;

    return a;
}
```

7.3.3.8 operator*() [2/3]

```
static THVector3 BeeGame.Core.THVector3.operator* (
            THVector3 a,
            float b )  [static]
```

Multiples b to vector a

Parameters

a	Vector a
b	float b

Returns

returns new vector that is the product of a and b

Definition at line 241 of file THVector3.cs.

```
        {
            a.x *= b;
            a.y *= b;
            a.z *= b;

            return a;
        }
```

7.3.3.9 operator*() [3/3]

```
static THVector3 BeeGame.Core.THVector3.operator* (
            float a,
            THVector3 b )  [static]
```

Multiples a to vector b

Parameters

a	Vector a
b	float b

Returns

returns new vector that is the product of a and b

Definition at line 255 of file THVector3.cs.

```
        {
            return new THVector3(a * b.x, a * b.y, a * b.z);
        }
```

7.3.3.10 operator+() [1/3]

```
static THVector3 BeeGame.Core.THVector3.operator+ (
            THVector3 a,
            THVector3 b )  [static]
```

Adds vector a and b

Parameters

a	Vector a
b	Vector b

Returns

returns new vector that is the sum of a and b

Definition at line 151 of file THVector3.cs.

```
        {
            a.x += b.x;
            a.y += b.y;
            a.z += b.z;

            return a;
        }
```

7.3.3.11 operator+() [2/3]

```
static THVector3 BeeGame.Core.THVector3.operator+ (
                THVector3 a,
                float b )   [static]
```

Adds b to vector a

Parameters

a	Vector a
b	float b

Returns

returns new vector that is the sum of a and b

Definition at line 165 of file THVector3.cs.

```
        {
            a.x += b;
            a.y += b;
            a.z += b;

            return a;
        }
```

7.3.3.12 operator+() [3/3]

```
static THVector3 BeeGame.Core.THVector3.operator+ (
                float a,
                THVector3 b )   [static]
```

Adds a to vector b

Parameters

a	Vector a
b	float b

Returns

returns new vector that is the sum of a and b

Definition at line 179 of file THVector3.cs.

```
        {
            return new THVector3(a + b.x, a + b.y, a + b.z);
        }
```

7.3.3.13 operator-() [1/3]

```
static THVector3 BeeGame.Core.THVector3.operator- (
            THVector3 a,
            THVector3 b ) [static]
```

Subtracs vector a and b

Parameters

a	Vector a
b	Vector b

Returns

returns new vector that is the subtraction of a and b

Definition at line 189 of file THVector3.cs.

```
        {
            a.x -= b.x;
            a.y -= b.y;
            a.z -= b.z;

            return a;
        }
```

7.3.3.14 operator-() [2/3]

```
static THVector3 BeeGame.Core.THVector3.operator- (
            THVector3 a,
            float b ) [static]
```

Subtracts b from vector a

Parameters

a	Vector a
b	float b

Returns

returns new vector that is the subtraction of a and b

Definition at line 203 of file THVector3.cs.

```
        {
            a.x += b;
            a.y += b;
            a.z += b;

            return a;
        }
```

7.3.3.15 operator-() [3/3]

```
static THVector3 BeeGame.Core.THVector3.operator- (
            float a,
            THVector3 b ) [static]
```

Subtracts a from vector b

Parameters

a	Vector a
b	float b

Returns

returns new vector that is the subtraction of a and b

Definition at line 217 of file THVector3.cs.

```
        {
            return new THVector3(a - b.x, a - b.y, a - b.z);
        }
```

7.3.3.16 operator/() [1/3]

```
static THVector3 BeeGame.Core.THVector3.operator/ (
            THVector3 a,
            THVector3 b ) [static]
```

Divides vector a and b

Parameters

a	Vector a
b	Vector b

Returns

returns new vector that is the division of a and b

Definition at line 265 of file THVector3.cs.

```
        {
            a.x /= b.x;
            a.y /= b.y;
            a.z /= b.z;

            return a;
        }
```

7.3.3.17 operator/() [2/3]

static THVector3 BeeGame.Core.THVector3.operator/ (
    THVector3 *a*,
    float *b*) [static]

Divides a by b

Parameters

a	Vector a
b	float b

Returns

returns new vector that is the division of a and b

Definition at line 279 of file THVector3.cs.

```
        {
            a.x /= b;
            a.y /= b;
            a.z /= b;

            return a;
        }
```

7.3.3.18 operator/() [3/3]

static THVector3 BeeGame.Core.THVector3.operator/ (
    float *a*,
    THVector3 *b*) [static]

Divides b by a

Parameters

a	Vector a
b	float b

Returns

returns new vector that is the division of a and b

Definition at line 293 of file THVector3.cs.

```
        {
            return new THVector3(a / b.x, a / b.y, a / b.z);
        }
```

7.3.3.19 operator==()

```
static bool BeeGame.Core.THVector3.operator== (
            THVector3 a,
            THVector3 b )  [static]
```

Checks if *a* == *b*

Parameters

a	First vector
b	Second vector

Returns

true if *a* == *b*

Definition at line 130 of file THVector3.cs.

```
        {
            return a.Equals(b);
        }
```

7.3.3.20 ToString()

```
override string BeeGame.Core.THVector3.ToString ( )
```

Formats the vector as a nice string

Returns

The vector as a nice string

Definition at line 119 of file THVector3.cs.

```
        {
            return $"{x}, {y}, {z}";
        }
```

7.3.4 Member Data Documentation

7.3.4.1 x

```
float BeeGame.Core.THVector3.x
```

X position

Definition at line 16 of file THVector3.cs.

7.3.4.2 y

```
float BeeGame.Core.THVector3.y
```

Y postion

Definition at line 20 of file THVector3.cs.

7.3.4.3 z

```
float BeeGame.Core.THVector3.z
```

Z position

Definition at line 24 of file THVector3.cs.

The documentation for this struct was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/UnityTypeReplacements/T↩
HVector3.cs

8 Misc

8.1 BeeGame.Serialization.Serialization Class Reference

Serializes and Deserialises things

Static Public Member Functions

- static void MakeDirectorys ()

    Sets the paths for the save files
- static void SerializeInventory (Inventory.Inventory inventory, string inventoryName)

    Serializes a given Inventory
- static void DeSerializeInventory (Inventory.Inventory inventory, string inventoryName)

    Deserializesd an Inventory from its name into a given inventory
- static void SaveChunk (Chunk chunk)

    Saves a given Chunk if a block in it has been changed
- static bool LoadChunk (Chunk chunk)

    Load a Chunk
- static string FileName (ChunkWorldPos pos)

    Sets the file name of the Chunk

Static Public Attributes

- static string worldName = "World"

    Name if the world. If multiple world are ever added
- static string saveFolderName = "Saves"

    Save folder

Static Private Member Functions

- static void SaveFile (object obj, string file)

    Saves the given data in the given file
- static object LoadFile (string file)

    Loads the file at the given path

Static Private Attributes

- static string savePath

    Path to save things

8.1.1 Detailed Description

Serializes and Deserialises things

Binary serialization is SLOW try to only serialize only what is absolutly necessary

Definition at line 18 of file Serialization.cs.

8.1.2 Member Function Documentation

8.1.2.1 DeSerializeInventory()

```
static void BeeGame.Serialization.Serialization.DeSerializeInventory (
             Inventory.Inventory inventory,
             string inventoryName )  [static]
```

Deserializesd an Inventory from its name into a given *inventory*

Parameters

inventory	Inventory to apply the data to
inventoryName	Inventory to deserialize

Definition at line 71 of file Serialization.cs.

```
        {
            //* make the path
            string inventorySavePath = $"{savePath}/Inventorys/{inventoryName}.dat";

            //* checks that the file exists
            if (!File.Exists(inventorySavePath))
                return;

            inventory.SetAllItems((ItemsInInventory)LoadFile($"{inventorySavePath}"
     ));
        }
```

8.1.2.2 FileName()

```
static string BeeGame.Serialization.Serialization.FileName (
            ChunkWorldPos pos )  [static]
```

Sets the file name of the Chunk

Parameters

pos	Position of teh Chunk

Returns

The string of pos

Definition at line 134 of file Serialization.cs.

```
        {
            return $"{pos.x}, {pos.y}, {pos.z}";
        }
```

8.1.2.3 LoadChunk()

```
static bool BeeGame.Serialization.Serialization.LoadChunk (
            Chunk chunk )  [static]
```

Load a Chunk

Parameters

chunk	

Returns

Definition at line 109 of file Serialization.cs.

```
        {
            //* gets the save file
            string saveFile = $"{savePath}/{FileName(chunk.chunkWorldPos)}.dat";

            //* if the file does not exist return false
            if (!File.Exists(saveFile))
                return false;

            //* set all of the changed blocks in the chunk
            SaveChunk save = (SaveChunk)LoadFile(saveFile);

            foreach (var block in save.blocks)
            {
                chunk.blocks[block.Key.x, block.Key.y, block.Key.z] = block.Value;
            }

            return true;
        }
```

8.1.2.4 LoadFile()

static object BeeGame.Serialization.Serialization.LoadFile (
    string *file*) [static], [private]

Loads the file at the given path

Parameters

file	File to load

Returns

returns the loaded file as an object

Definition at line 171 of file Serialization.cs.

```
        {
            BinaryFormatter bf = new BinaryFormatter();
            FileStream fs = new FileStream(file, FileMode.Open);

            try
            {
                return bf.Deserialize(fs);
            }
            catch(SerializationException e)
            {
                Debug.Log($"Deserialization Exception {e}");
                throw new SerializationException();
            }
            finally
            {
                fs.Close();
            }
        }
```

8.1.2.5 MakeDirectorys()

`static void BeeGame.Serialization.Serialization.MakeDirectorys ( ) [static]`

Sets the paths for the save files

Definition at line 38 of file Serialization.cs.

```
        {
            savePath = $"{Application.dataPath}/{saveFolderName}/{worldName}";

            if (!(Directory.Exists(savePath)))
                Directory.CreateDirectory(savePath);
        }
```

8.1.2.6 SaveChunk()

```
static void BeeGame.Serialization.Serialization.SaveChunk (
              Chunk chunk )  [static]
```

Saves a given Chunk if a block in it has been changed

Parameters

chunk	

Definition at line 89 of file Serialization.cs.

```
        {
            //* saves the blocks
            SaveChunk save = new SaveChunk(chunk.blocks);

            //* if no block was changed return early
            if (save.blocks.Count == 0)
                return;

            //* otherwise save the file
            string saveFile = $"{savePath}/{FileName(chunk.chunkWorldPos)}.dat";

            SaveFile(save, saveFile);
        }
```

8.1.2.7 SaveFile()

```
static void BeeGame.Serialization.Serialization.SaveFile (
              object obj,
              string file )  [static], [private]
```

Saves the given data in the given file

Parameters

obj	Object to save
file	File path to save to

Definition at line 146 of file Serialization.cs.

```
        {
            BinaryFormatter bf = new BinaryFormatter();
            FileStream fs = new FileStream(file, FileMode.OpenOrCreate);

            try
            {
                bf.Serialize(fs, obj);
            }
            catch(SerializationException e)
            {
                Debug.Log($"Serialization Exception: {e}");
                throw new SerializationException();
            }
            finally
            {
                fs.Close();
            }
        }
```

8.1.2.8 SerializeInventory()

```
static void BeeGame.Serialization.Serialization.SerializeInventory (
            Inventory.Inventory inventory,
            string inventoryName )  [static]
```

Serializes a given Inventory

Parameters

inventory	Invenotry to Serialize
inventoryName	Name of the inventory

The name of the inventory for the player is "PlayerInventory".
For all other ivnetorys the name is the block type + its position eg, Apiay@0, 0, 0

Definition at line 56 of file Serialization.cs.

```
        {
            string inventorySavePath = $"{savePath}/Inventorys";

            if (!Directory.Exists(inventorySavePath))
                Directory.CreateDirectory(inventorySavePath);

            SaveFile(inventory.GetAllItems(), $"{inventorySavePath}/{inventoryName}.dat");
        }
```

8.1.3 Member Data Documentation

8.1.3.1 saveFolderName

```
string BeeGame.Serialization.Serialization.saveFolderName = "Saves"  [static]
```

Save folder

Definition at line 28 of file Serialization.cs.

8.1.3.2 savePath

```
string BeeGame.Serialization.Serialization.savePath  [static], [private]
```

Path to save things

Definition at line 32 of file Serialization.cs.

8.1.3.3 worldName

```
string BeeGame.Serialization.Serialization.worldName = "World"  [static]
```

Name if the world. If multiple world are ever added

Definition at line 24 of file Serialization.cs.

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Serialization/Serialization.cs

8.2 BeeGame.Core.Extensions Class Reference

Static Public Member Functions

- static T CloneObject< T > (this T obj)
  Allows the copying of a class by value useing reflection

8.2.1 Detailed Description

Definition at line 9 of file Extensions.cs.

8.2.2 Member Function Documentation

8.2.2.1 CloneObject< T >()

```
static T BeeGame.Core.Extensions.CloneObject< T > (
            this T obj )  [static]
```

Allows the copying of a class by value useing reflection

Parameters

obj	Object to copy

Returns

a new object with all values copyed

Mush faster than the serialize method however alot more complicated

Definition at line 19 of file Extensions.cs.

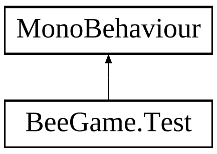
```
00020         {
00021             //*gets the tyoe of the given object
00022             Type typeSource = obj.GetType();
00023 
00024             //*makes a new object of type T
00025             T objTarget = (T)Activator.CreateInstance(typeSource);
00026 
00027             //*gets the properties in T
00028             PropertyInfo[] propertyInfo = typeSource.GetProperties(BindingFlags.Public | BindingFlags.
      NonPublic | BindingFlags.Instance);
00029 
00030             //*applies the properties in T to the new type T object
00031             foreach (var property in propertyInfo)
00032             {
00033                 if (property.CanWrite)
00034                 {
00035                     //*if the propertly is a value just set it
00036                     if (property.PropertyType.IsValueType || property.PropertyType.IsEnum || property.
      PropertyType.Equals(typeof(string)))
00037                     {
00038                         property.SetValue(objTarget, property.GetValue(obj, null), null);
00039                     }
00040                     else
00041                     {
00042                         //*if the propertly is not a value type this function will need to be called
       recursivly as it could also have non value type veriables
00043                         object propertyValue = property.GetValue(obj, null);
00044 
00045                         if (propertyValue == null)
00046                         {
00047                             property.SetValue(obj, null, null);
00048                         }
00049                         else
00050                         {
00051                             property.SetValue(obj, propertyValue.CloneObject(), null);
00052                         }
00053                     }
00054                 }
00055 
00056             }
00057             return objTarget;
00058         }
```

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/Extensions.cs

8.3 BeeGame.Test Class Reference

Inheritance diagram for BeeGame.Test:



Private Member Functions

- void Start ()

8.3.1 Detailed Description

Definition at line 10 of file test.cs.

8.3.2 Member Function Documentation

8.3.2.1 Start()

```
void BeeGame.Test.Start ( )  [private]
```

Definition at line 12 of file test.cs.

```
        {
            Instantiate(BeeGame.Core.PrefabDictionary.
GetPrefab("Selector"));
        }
```

The documentation for this class was generated from the following file:

- C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/test.cs

Part III

File Documentation

1 Items

1.1 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Items/Item.cs File Reference

Classes

- class BeeGame.Items.Item

  Base class for all Items and Blocks in the game
- struct BeeGame.Items.Tile

  Position of the items texture

Namespaces

- namespace BeeGame.Items

1.2 Item.cs

```
using System;
using UnityEngine;
using BeeGame.Terrain.Chunks;
using BeeGame.Core.Enums;
using BeeGame.Core;
using System.Runtime.Serialization.Formatters.Binary;
using System.IO;

namespace BeeGame.Items
{
    [Serializable]
    public class Item : ICloneable
    {
        #region Data
        internal string itemName = "Test Item";
        public bool placeable = false;
        public bool usesGameObject = false;
        private const float tileSize = 0.1f;

        public int itemStackCount = 1;
        public int maxStackCount = 64;
        #endregion

        #region Constructors
        public Item()
        {
            itemName = "TestItem";
        }

        public Item(string name)
        {
            itemName = name;
        }
        #endregion

        #region Item Stuff
        public virtual GameObject GetGameObject() { return null; }

        public virtual string GetItemID()
        {
            return $"{GetHashCode()}";
        }

        public virtual Sprite GetItemSprite()
        {
            return SpriteDictionary.GetSprite("TestSprite");
        }

        public virtual string GetItemName()
        {
            return $"{itemName}";
        }
        #endregion

        #region Item Mesh
        public virtual Tile TexturePosition(Direction direction)
        {
            return new Tile() { x = 1, y = 9 };
        }

        public virtual MeshData ItemMesh(int x, int y, int z, MeshData meshData)
        {
            //adds all faces of the item to the mesh as all faces could be seen at any time
            meshData = FaceDataUp(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataDown(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataNorth(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataEast(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataSouth(x, y, z, meshData, true, 0.25f);
            meshData = FaceDataWest(x, y, z, meshData, true, 0.25f);

            return meshData;
        }

        public virtual Vector2[] FaceUVs(Direction direction)
        {
            //only 4 uvs per face
            Vector2[] UVs = new Vector2[4];
            Tile tilePos = TexturePosition(direction);

            //sets the UVs for each vertex
            UVs[0] = new THVector2(tileSize * tilePos.x + tileSize - 0.01f, tileSize * tilePos.y + 0.01f);
            UVs[1] = new THVector2(tileSize * tilePos.x + tileSize - 0.01f, tileSize * tilePos.
y + tileSize - 0.01f);
            UVs[2] = new THVector2(tileSize * tilePos.x + 0.01f, tileSize * tilePos.y + tileSize - 0.01f);
            UVs[3] = new THVector2(tileSize * tilePos.x + 0.01f, tileSize * tilePos.y + 0.01f);

            return UVs;
        }

        protected virtual MeshData FaceDataUp(int x, int y, int z, MeshData meshData, bool addToRenderMesh = true, float blockSize = 0.5f)
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z + blockSize), addToRenderMesh, Direction.UP);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z + blockSize), addToRenderMesh, Direction.UP);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z - blockSize), addToRenderMesh, Direction.UP);
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z - blockSize), addToRenderMesh, Direction.UP);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.UP));

            return meshData;
        }

        protected virtual MeshData FaceDataDown(int x, int y, int z, MeshData meshData, bool addToRenderMesh = true, float blockSize = 0.5f)
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z + blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z + blockSize), addToRenderMesh);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.DOWN));

            return meshData;
        }

        protected virtual MeshData FaceDataNorth(int x, int y, int z, MeshData meshData, bool addToRenderMesh = true, float blockSize = 0.5f)
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z + blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z + blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z + blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z + blockSize), addToRenderMesh);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.NORTH));

            return meshData;
        }

        protected virtual MeshData FaceDataEast(int x, int y, int z, MeshData meshData, bool addToRenderMesh = true, float blockSize = 0.5f)
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z +
blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z + blockSize), addToRenderMesh);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.EAST));

            return meshData;
        }

        protected virtual MeshData FaceDataSouth(int x, int y, int z, MeshData meshData, bool addToRenderMesh = true, float blockSize = 0.5f)
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y + blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x + blockSize, y - blockSize, z - blockSize), addToRenderMesh);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.SOUTH));

            return meshData;
        }

        protected virtual MeshData FaceDataWest(int x, int y, int z, MeshData meshData, bool addToRenderMesh = true, float blockSize = 0.5f)
        {
            //Adds vertices in a anti-clockwise order
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z + blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z + blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y + blockSize, z - blockSize), addToRenderMesh);
            meshData.AddVertices(new THVector3(x - blockSize, y - blockSize, z - blockSize), addToRenderMesh);

            //adds teh tirs for the quad
            meshData.AddQuadTriangles(addToRenderMesh);

            //if the data should be added to the render mesh also add the uvs to the mesh
            if (addToRenderMesh)
                meshData.uv.AddRange(FaceUVs(Direction.WEST));

            return meshData;
        }
        #endregion

        #region Interfaces
        public object Clone()
        {
            //Saves this to a file then reads it back so that a copy and not a reference is passed
            BinaryFormatter bf = new BinaryFormatter();
            MemoryStream ms = new MemoryStream();

            bf.Serialize(ms, this);
            ms.Seek(0, SeekOrigin.Begin);

            return bf.Deserialize(ms);
        }
        #endregion

        #region Overrides
        public override string ToString()
        {
            return $"{itemName} \nID: {GetItemID()}";
        }

        public override int GetHashCode()
        {
            return 1;
        }

        public override bool Equals(object obj)
        {
            if (!(obj is Item))
                return false;

            return this == (obj as Item);
        }

        public static bool operator ==(Item a, Item b)
        {
            if (ReferenceEquals(a, null) && ReferenceEquals(b, null))
                return true;
            if (ReferenceEquals(a, null) || ReferenceEquals(b, null))
                return false;

            if(a.GetItemID() == b.GetItemID())
                return true;

            return false;
        }

        public static bool operator !=(Item a, Item b)
        {
            return !(a == b);
        }
        #endregion
    }

    [Serializable]
    public struct Tile
    {
        public int x;
        public int y;
    }
}
```

1.3 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Items/ItemGameObject.cs File Reference

Classes

- class BeeGame.Items.ItemGameObject

  Interface between item and inity gameobjects

Namespaces

- namespace BeeGame.Items

1.4 ItemGameObject.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using BeeGame.Terrain.Chunks;
using BeeGame.Blocks;
using UnityEngine;

namespace BeeGame.Items
{
    [RequireComponent(typeof(Rigidbody))]
    [RequireComponent(typeof(MeshFilter))]
    [RequireComponent(typeof(MeshRenderer))]
    [RequireComponent(typeof(BoxCollider))]
    public class ItemGameObject : MonoBehaviour
    {
        public Item item;
        public GameObject go;

        private void Start()
        {
            if (!item.usesGameObject)
                MakeMesh();

            if (item.usesGameObject)
            {
                GetComponent<BoxCollider>().enabled = false;
                Instantiate(item.GetGameObject(), transform, false);
            }
        }

        void MakeMesh()
        {
            MeshData meshData = new MeshData();
            if(item != null)
                meshData = item.ItemMesh(0, 0, 0, meshData);

            Mesh mesh = new Mesh()
            {
                vertices = meshData.verts.ToArray(),
                triangles = meshData.tris.ToArray(),
                uv = meshData.uv.ToArray()
            };

            mesh.RecalculateNormals();

            GetComponent<MeshFilter>().mesh = mesh;
        }
    }
}
```

2 Blocks

2.1 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Block.cs File Reference

Classes

- class BeeGame.Blocks.Block

    Base class for blocks

Namespaces

- namespace BeeGame.Blocks

2.2 Block.cs

```
using UnityEngine;
using BeeGame.Terrain.Chunks;
using BeeGame.Core.Enums;
using BeeGame.Items;
using BeeGame.Core;

namespace BeeGame.Blocks
{
    [System.Serializable]
    public class Block : Item
    {
        #region Data
        public bool breakable = true;
        public bool changed = true;
        #endregion

        #region Constructor
        public Block() : base()
        {
            itemName = "Stone";
            placeable = true;
        }

        public Block(string name) : base(name)
        {
            placeable = true;
        }
        #endregion

        #region Update/Break Block
        public virtual void BreakBlock(THVector3 pos)
        {
            GameObject go = Object.Instantiate(UnityEngine.Resources.Load("Prefabs/ItemGameObject") as GameObject, pos, Quaternion.identity) as GameObject;
            go.GetComponent<ItemGameObject>().item = this;
        }

        public virtual void UpdateBlock(int x, int y, int z, Chunk chunk) { }
        #endregion

        #region Mesh
        public virtual MeshData BlockData(Chunk chunk, int x, int y, int z, MeshData meshData, bool addToRenderMesh = true)
        {
            //Adds the Top face of the block
            if (!chunk.GetBlock(x, y + 1, z, false).IsSolid(Direction.DOWN))
            {
                meshData = FaceDataUp(x, y, z, meshData, addToRenderMesh);
            }

            //Adds the Bottom face of the block
            if (!chunk.GetBlock(x, y - 1, z, false).IsSolid(Direction.UP))
            {
                meshData = FaceDataDown(x, y, z, meshData, addToRenderMesh);
            }

            //Adds the North face of the block
            if (!chunk.GetBlock(x, y, z + 1, false).IsSolid(Direction.SOUTH))
            {
                meshData = FaceDataNorth(x, y, z, meshData, addToRenderMesh);
            }

            //Adds the South face of the block
            if (!chunk.GetBlock(x, y, z - 1, false).IsSolid(Direction.NORTH))
            {
                meshData = FaceDataSouth(x, y, z, meshData, addToRenderMesh);
            }

            //Adds the East face of the block
            if (!chunk.GetBlock(x + 1, y, z, false).IsSolid(Direction.WEST))
            {
                meshData = FaceDataEast(x, y, z, meshData, addToRenderMesh);
            }

            //Adds the West face of the block
            if (!chunk.GetBlock(x - 1, y, z, false).IsSolid(Direction.EAST))
            {
                meshData = FaceDataWest(x, y, z, meshData, addToRenderMesh);
            }

            return meshData;

        }

        public virtual bool IsSolid(Direction direction)
        {
            return true;
        }
        #endregion

        #region Overrides
        public override int GetHashCode()
        {
            return 1;
        }

        public override string ToString()
        {
            return $"{itemName} \nID: {GetHashCode()}";
        }
        #endregion
    }
}
```

2.3 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Air.cs File Reference

Classes

- class BeeGame.Blocks.Air

    Air Block is an empty block that does not render and has no collider

Namespaces

- namespace BeeGame.Blocks

2.4 Air.cs

```
using System;
using BeeGame.Core.Enums;
using BeeGame.Terrain.Chunks;
using BeeGame.Core;

namespace BeeGame.Blocks
{
    [Serializable]
    public class Air : Block
    {
        public Air() : base("Air")
        {
        }

        public override void BreakBlock(THVector3 pos)
        {
            return;
        }

        public override MeshData BlockData(Chunk chunk, int x, int y, int z,
MeshData meshData, bool addRoRenderMesh = true)
        {
            return meshData;
        }

        public override bool IsSolid(Direction direction)
        {
            return false;
        }

        public override int GetHashCode()
        {
            return 2;
        }

        public override string ToString()
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
    }
}
```

2.5 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Bedrock.cs File Reference

Classes

- class BeeGame.Blocks.Bedrock

    Bedrock Block

Namespaces

- namespace BeeGame.Blocks

2.6 Bedrock.cs

```
using System;
using BeeGame.Core.Enums;
using BeeGame.Items;
using BeeGame.Core;

namespace BeeGame.Blocks
{
    [Serializable]
    public class Bedrock : Block
    {
        #region Constructor
        public Bedrock() : base("Bedrock")
        {
            breakable = false;
        }
        #endregion

        #region Break Block
        public override void BreakBlock(THVector3 pos)
        {
            return;
        }
        #endregion

        #region Mesh
        public override Tile TexturePosition(Direction direction)
        {
            return new Tile() { x = 0, y = 0};
        }
        #endregion

        #region Overrides
        public override int GetHashCode()
        {
            return -1;
        }

        public override string ToString()
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
        #endregion
    }
}
```

2.7 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Apiary.cs File Reference

Classes

- class BeeGame.Blocks.Apiary

  Apiary Block

Namespaces

- namespace BeeGame.Blocks

2.8 Apiary.cs

```
using System.Runtime.Serialization;

namespace BeeGame.Blocks
{
    public class Apiary : Block
    {
        #region Constructor
        public Apiary() : base("Apiary")
        {
        }
        #endregion

        public Apiary(SerializationInfo info, StreamingContext context)
        {
            //*use info.getvalue("valuename", typeof(valueType))
            UnityEngine.MonoBehaviour.print("hi");
        }

        #region Overrides
        public override int GetHashCode()
        {
            return 3;
        }

        public override string ToString()
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
        #endregion
    }
}
```

2.9 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Dirt.cs File Reference

Classes

- class BeeGame.Blocks.Dirt

  Dirt Block

Namespaces

- namespace BeeGame.Blocks

2.10 Dirt.cs

```
using System;
using BeeGame.Core.Enums;
using BeeGame.Items;

namespace BeeGame.Blocks
{
    [Serializable]
    public class Dirt : Block
    {
        #region Constructor
        public Dirt() : base("Dirt"){}
        #endregion

        #region Mesh
        public override Tile TexturePosition(Direction direction)
        {
            return new Tile { x = 2, y = 9 };
        }
        #endregion

        #region Overrides
        public override int GetHashCode()
        {
            return 5;
        }

        public override string ToString()
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
        #endregion
    }
}
```

2.11 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Blocks/Grass.cs File Reference

Classes

- class BeeGame.Blocks.Grass

  Grass Block

Namespaces

- namespace BeeGame.Blocks

2.12 Grass.cs

```
using System;
using BeeGame.Core.Enums;
using BeeGame.Terrain.Chunks;
using BeeGame.Items;

namespace BeeGame.Blocks
{
    [Serializable]
    public class Grass : Block
    {
        #region Constructor
        public Grass() : base("Grass"){}
        #endregion

        #region Mesh
        public override void UpdateBlock(int x, int y, int z, Chunk chunk)
        {
            if (chunk.GetBlock(x, y + 1, z, false).IsSolid(Direction.DOWN))
                chunk.blocks[x, y, z] = new Dirt() { changed = changed };
        }

        public override Tile TexturePosition(Direction direction)
        {
            //All textures are on the dame Y value for the texture atlas so Y can be set
            Tile tile = new Tile()
            {
                y = 9
            };

            switch (direction)
            {
                //if we want the top face return the full grass texture
                case Direction.UP:
                    tile.x = 3;
                    return tile;
                //if we want the bottom face return the dirt texture
                case Direction.DOWN:
                    tile.x = 2;
                    return tile;
                //return the 1/2 grass testure if a side face is wanted
                default:
                    tile.x = 4;
                    return tile;
            }
        }
        #endregion

        #region Overrides
        public override string GetItemName()
        {
            return "Grass";
        }

        public override int GetHashCode()
        {
            return 4;
        }

        public override string ToString()
        {
            return $"{itemName} \nID: {GetItemID()}";
        }
        #endregion
    }
}
```

3 Inventorys

3.1 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Inventory/Inventory.cs File Reference

Classes

- class BeeGame.Inventory.Inventory

  Base class for all inventorys in the game

Namespaces

- namespace BeeGame.Inventory

3.2 Inventory.cs

```
using UnityEngine;
using BeeGame.Items;

namespace BeeGame.Inventory
{
    public class Inventory : MonoBehaviour
    {
        #region Data
        private ItemsInInventory items;
        public InventorySlot[] slots;
        internal Item floatingItem;
        public string inventoryName = "";
        #endregion

        #region Init
        public bool InventorySet()
        {
            if (items == null)
                return true;

            return false;
        }

        public void SetInventorySize(int inventorySize)
        {
            items = new ItemsInInventory(slots.Length);
        }

        public void SetAllItems(ItemsInInventory items)
        {
            this.items = items;
        }
        #endregion

        #region Update
        public void UpdateBase()
        {
            PutItemsInSlots();
        }
        #endregion

        #region Edit Inventory
        void PutItemsInSlots()
        {
            //* goes through all of the items in the array setting then all to a slot
            for (int i = 0; i < slots.Length; i++)
            {
                slots[i].slotIndex = i;
                slots[i].myInventory = this;
                slots[i].item = items.itemsInInventory[i];
            }
        }

        public ItemsInInventory GetAllItems()
        {
            return items;
        }

        public void AddItemToSlots(int slotIndex, Item item)
        {
            items.AddItem(slotIndex, item);
            //* saves the inventory changes
            Serialization.Serialization.SerializeInventory(this, inventoryName);
        }

        public bool AddItemToInventory(Item item)
        {
            return items.AddItem(item);
        }
        #endregion
    }
}
```

3.3 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Inventory/ItemsInInventory.cs File Reference

Classes

- class BeeGame.Inventory.ItemsInInventory

  Class that holds all of the items in the inventory. Can be serialized so inventory may be saved

Namespaces

- namespace BeeGame.Inventory

3.4 ItemsInInventory.cs

```
using System;
using BeeGame.Items;

namespace BeeGame.Inventory
{
    [Serializable]
    public class ItemsInInventory
    {
        public Item[] itemsInInventory;

        public ItemsInInventory(int numberOfInventorySlots)
        {
            itemsInInventory = new Item[numberOfInventorySlots];
        }

        public void AddItem(int index, Item item)
        {
            itemsInInventory[index] = item;
        }

        public bool AddItem(Item item)
        {
            for (int i = 0; i < itemsInInventory.Length; i++)
            {
                if (itemsInInventory[i] == null)
                {
                    itemsInInventory[i] = item;
                    return true;
                }
                if (itemsInInventory[i] == item && itemsInInventory[i].itemStackCount + 1 <=
itemsInInventory[i].maxStackCount)
                {
                    itemsInInventory[i].itemStackCount++;
                    return true;
                }
            }

            return false;
        }
    }
}
```

3.5 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Inventory/InventorySlot.cs File Reference

Classes

- class BeeGame.Inventory.InventorySlot

Namespaces

- namespace BeeGame.Inventory

3.6 InventorySlot.cs

```
using UnityEngine;
using UnityEngine.UI;
using UnityEngine.EventSystems;
using BeeGame.Items;
using BeeGame.Core;

namespace BeeGame.Inventory
{
    public class InventorySlot : MonoBehaviour, IPointerClickHandler, IPointerEnterHandler,
IPointerExitHandler
    {
        #region Data
        internal int slotIndex;
        public Item item;
        public Inventory myInventory;
        public GameObject itemText;
        public bool selectedSlot = false;
        #endregion

        private void Update()
        {
            UpdateIcon();
        }

        void UpdateIcon()
        {
            if(item == null)
            {
                GetComponent<Image>().sprite = null;
            }
            else
            {
                GetComponent<Image>().sprite = item.GetItemSprite();
            }

            //* if the slot is selected in the hotbar give the player some indication by colouring it grey
            if (selectedSlot)
            {
                GetComponent<Image>().color = Color.gray;
            }
            else
            {
                GetComponent<Image>().color = Color.white;
            }
        }

        #region Interact With Slot
        public void OnPointerClick(PointerEventData eventData)
        {
            if (myInventory.floatingItem != null)
            {
                //* Left click moves whole stacks if items
                if (eventData.button == PointerEventData.InputButton.Left)
                {
                    //* If the item in the slot is empty put the floating item into it then clear it
                    if (item == null)
                    {
                        item = myInventory.floatingItem;
                        myInventory.floatingItem = null;
                        myInventory.AddItemToSlots(slotIndex, item);
                        return;
                    }
                    //* if the items are the same
                    if(myInventory.floatingItem == item)
                    {
                        //* if the item in the inventoys stack count + the floating items stack count is less than the max stack count
                        if (myInventory.floatingItem.itemStackCount + item.itemStackCount <= item.maxStackCount)
                        {
                            AddToSlot(myInventory.floatingItem.itemStackCount);
                            return;
                        }
                        //* if the item stack added is larger than the max count add as many as you can and move on
                        else
                        {
                            AddToSlot(item.maxStackCount - item.itemStackCount);
                            return;
                        }
                    }
                    //* If the items were not == swap them
                    else
                    {
                        SwapItems();
                        return;
                    }
                }
                else if(eventData.button == PointerEventData.InputButton.Right)
                {
                    //* if the item in slot is null add 1 from the floating item to it
                    if(item == null)
                    {
                        AddToSlot(1);
                        return;
                    }
                    //* if the items are the same add 1 from the floating item to this item
                    else if(item == myInventory.floatingItem)
                    {
                        AddToSlot(1);
                        return;
                    }
                }
            }
            //* if the floating item is null
            else
            {
                //* add 1/2 of the stack into the floating item if right click was pressed
                if(eventData.button == PointerEventData.InputButton.Right)
                {
                    SplitStack();
                    return;
                }

                //* otherwie add the items into the floating item slot
                SwapItems();
                return;
            }

        }

        void AddToSlot(int numerToAdd)
        {
            //* if the item in the slot is null create it
            if (item == null)
            {
                item = myInventory.floatingItem.CloneObject();
                item.itemStackCount = 0;
            }

            //* add to number to add to the stack count
            item.itemStackCount += numerToAdd;

            //* if the stack count is now larger than it should be dont let it be
            if (item.itemStackCount > item.maxStackCount)
            {
                item.itemStackCount = item.maxStackCount;
            }

            //* remove the numebr if items form the floating item then check the floating item is not null
            myInventory.floatingItem.itemStackCount -= numerToAdd;
            CheckFloatingItem();
            //* save the inventory changes
            myInventory.AddItemToSlots(slotIndex, item);
        }

        void SplitStack()
        {
            myInventory.floatingItem = item.CloneObject();
            int give = (item.itemStackCount + 1) / 2;
            myInventory.floatingItem.itemStackCount = give;
            item.itemStackCount -= give;

            if (item.itemStackCount <= 0)
                item = null;

            myInventory.AddItemToSlots(slotIndex, item);
            Destroy(itemText);
        }

        void SwapItems()
        {
            //* temp copy of the item
            Item temp = myInventory.floatingItem;
            //* sets the floating item
            myInventory.floatingItem = item;
            //* sets the item that was in the floating item to the item in the the slot
            item = temp;
            //* Saves the changes to the inventory
            myInventory.AddItemToSlots(slotIndex, item);
            //* destroys the text as it is not needed anymore
            Destroy(itemText);
        }

        void CheckFloatingItem()
        {
            if(myInventory.floatingItem.itemStackCount <= 0)
            {
                myInventory.floatingItem = null;
            }
        }
        #endregion

        #region Display Item On Hover
        public void OnPointerEnter(PointerEventData eventData)
        {
            //* if the item is null or the floating item has something in it dont display the item text as
 it is not necissary
            if (item != null && myInventory.floatingItem == null)
            {
                itemText = Instantiate(PrefabDictionary.
      GetPrefab("ItemDetails"));
                //* sets the text to the correct postion
                itemText.transform.GetChild(0).position = Input.mousePosition;
                //* puts the correct text in the box
                itemText.transform.GetChild(0).GetChild(0).GetComponent<Text>().text = $"
      {item.GetItemName()}\nStack: {item.itemStackCount}";
            }
        }

        public void OnPointerExit(PointerEventData eventData)
        {
            Destroy(itemText);
        }

        void OnDisable()
        {
            Destroy(itemText);
        }
        #endregion
    }
}
```

3.7 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Inventory/Player Inventory/↩ PlayerInventory.cs File Reference

Classes

- class BeeGame.Inventory.Player_Inventory.PlayerInventory

  Controlls the player inventory

Namespaces

- namespace BeeGame.Inventory.Player_Inventory

3.8 PlayerInventory.cs

```
using UnityEngine;
using BeeGame.Items;
using BeeGame.Core;

namespace BeeGame.Inventory.Player_Inventory
{
    public class PlayerInventory : Inventory
    {
        #region Data
        public GameObject playerInventory;
        #endregion

        #region Init
        void Start()
        {
            SetPlayerInventory();
            inventoryName = "PlayerInventory";
            Serialization.Serialization.DeSerializeInventory(this, inventoryName);
        }

        void SetPlayerInventory()
        {
            if (InventorySet())
                SetInventorySize(20);
        }
        #endregion

        void Update()
        {
            UpdateBase();

            //* whecks if the inventory should be opened/closed
            if (THInput.GetButtonDown("Player Inventory"))
                OpenPlayerInventory();

            //* checks if somethig shoul dbe picked up and put into the inventory
            RaycastHit[] hit = Physics.SphereCastAll(transform.position, 1f, transform.forward);

            for (int i = hit.Length - 1; i >= 0; i--)
            {
                if (hit[i].collider.GetComponent<ItemGameObject>())
                    PickupItem(hit[i].collider.GetComponent<ItemGameObject>());
            }

        }

        #region Hotbar
        public void SelectedSlot(int index)
        {
            for (int i = 0; i < slots.Length; i++)
            {
                slots[i].selectedSlot = false;
            }

            slots[index].selectedSlot = true;
        }

        public bool GetItemFromHotBar(int slotIndex, out Item outItem)
        {
            //* get the item
            outItem = GetAllItems().itemsInInventory[slotIndex];

            if (outItem == null)
                return false;

            //* if the item is placebale and is not null remove 1 from the inventory as it is assumed it is
 about to be placed in the world
            if(outItem.placeable)
                RemoveItemFromInventory(slotIndex);

            return outItem.placeable;
        }
        #endregion

        #region Interact With Inventory
        void OpenPlayerInventory()
        {
            playerInventory.SetActive(!playerInventory.activeInHierarchy);
            THInput.isAnotherInventoryOpen = !
THInput.isAnotherInventoryOpen;

            //* hides/ shows the mouse depending on if te inventory is open or not
            if (playerInventory.activeInHierarchy)
            {
                Cursor.lockState = CursorLockMode.None;
                Cursor.visible = true;
            }
            else
            {
                Cursor.visible = false;
                Cursor.lockState = CursorLockMode.Locked;
            }
        }

        public void RemoveItemFromInventory(int index)
        {
            //* if the item is already null nothign needs to be removed
            if (GetAllItems().itemsInInventory[index] != null)
            {
                //* remove 1 item and if that was the last in the stack remove the item from the inventory
                GetAllItems().itemsInInventory[index].itemStackCount -= 1;

                if (GetAllItems().itemsInInventory[index].itemStackCount <= 0)
                    GetAllItems().itemsInInventory[index] = null;

                Serialization.Serialization.SerializeInventory(this, inventoryName);
            }
        }

        void PickupItem(ItemGameObject item)
        {
            //* if the item can be added to the inventory do that
            if (AddItemToInventory(item.item))
            {
                //* if the item was added destroyits gameobject and save the inventory
                Destroy(item.gameObject);
                Serialization.Serialization.SerializeInventory(this, inventoryName);
            }
        }
        #endregion
    }
}
```

4 Chunks

4.1 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/Chunks/Chunk.cs File Reference

Classes

- class BeeGame.Terrain.Chunks.Chunk

  A section of land for the game, used so that land can be generated in parts and not all at once

Namespaces

- namespace BeeGame.Terrain.Chunks

4.2 Chunk.cs

```
using UnityEngine;
using BeeGame.Blocks;
using BeeGame.Terrain.LandGeneration;
using System.Threading;

namespace BeeGame.Terrain.Chunks
{
    [RequireComponent(typeof(MeshFilter))]
    [RequireComponent(typeof(MeshRenderer))]
    [RequireComponent(typeof(MeshCollider))]
    public class Chunk : MonoBehaviour
    {
        #region Data
        public static int chunkSize = 16;

        public Block[,,] blocks = new Block[chunkSize, chunkSize, chunkSize];

        public bool update = true;
        public bool rendered;

        public bool updateCollsionMesh = false;
        public bool applyCollisionMesh = false;

        public World world;
        public ChunkWorldPos chunkWorldPos;

        private MeshData mesh = new MeshData();

        private MeshFilter filter;
        private MeshCollider meshCollider;
        #endregion

        #region Unity Methods
        void Start()
        {
            filter = GetComponent<MeshFilter>();
            meshCollider = GetComponent<MeshCollider>();
        }

        void Update()
        {
            lock(mesh)
            {
                if (update)
                {
                    update = false;
                    updateCollsionMesh = true;
                    mesh = new MeshData();
                    //Enabling threading here works in editor but not in build?
                    //ok whatever...
                    //Thread thread = new Thread(UpdateChunk);

                    //thread.Start();
                    UpdateChunk();
                }

                if (mesh.done && mesh != new MeshData())
                {
                    RenderMesh(mesh);
                }

                if (applyCollisionMesh)
                    ColliderMesh();
            }
        }
        #endregion

        #region Get/Set Blocks
        public Block GetBlock(int x, int y, int z, bool checkNebouringChunks = true)
        {
            //checks that block is in the chunk
            if (InRange(x) && InRange(y) && InRange(z))
                return blocks[x, y, z];

            //if the block is not in the chunk and we should check other chunks do that, otherwise return an air block (empty block)
            if(checkNebouringChunks)
                return world.GetBlock(chunkWorldPos.x + x, chunkWorldPos.y + y, chunkWorldPos.z + z);

            return new Air();
        }

        public void SetBlock(int x, int y, int z, Block block)
        {
            //sets the block in the position if it is in the chunk, then return early
            if (InRange(x) && InRange(y) && InRange(z))
            {
                blocks[x, y, z] = block;
                return;
            }
            //if the block is not in the chunk find its chunk and set it their
            world.SetBlock(chunkWorldPos.x + x, chunkWorldPos.y + y, chunkWorldPos.z + z, block);
        }

        public static bool InRange(int i)
        {
            //if the value is less then 0 or greater than 16 the value is outside the chunk
            if (i < 0 || i >= chunkSize)
```

```
                return false;
            return true;
        }
        #endregion

        #region Mesh
        public void SetBlocksUnmodified()
        {
            foreach (var block in blocks)
            {
                block.changed = false;
            }
        }

        void UpdateChunk()
        {
            //says that this chunk is rendered and initialtes the mesh
            rendered = true;

            //goes through every block in the blocks array getting their mesh data
            for (int x = 0; x < chunkSize; x ++)
            {
                for (int z = 0; z < chunkSize; z ++)
                {
                    for (int y = 0; y < chunkSize; y ++)
                    {
                        blocks[x, y, z].UpdateBlock(x, y, z, this);
                        mesh = blocks[x, y, z].BlockData(this, x, y, z, mesh);
                    }
                }
            }
            mesh.done = true;
        }

        void RenderMesh(MeshData meshData)
        {
            //Applying the mesh takes the longest but nothing can be dont with the mesh class in a
secondary thread...thanks unity

            mesh.done = false;
            //clears the current chunk mesh
            filter.mesh.Clear();
            //name for convenience
            filter.mesh.name = "Render Mesh";
            //puts the tris and verts from the meshdata into the chunk mesh
            filter.mesh.vertices = meshData.verts.ToArray();
            filter.mesh.triangles = meshData.tris.ToArray();

            //sets the uvs
            filter.mesh.uv = meshData.uv.ToArray();

            //redoes the normals incase they got messed up
            filter.mesh.RecalculateNormals();
        }

        void ColliderMesh()
        {
            //if the chunk has been told to update the collsions but the chunk has ne verts dont do it as
their is no point
            if (this.mesh.verts.Count == 0)
                return;

            //if the render and collision meshes should be shared set the render mesh to the collision mesh
otherwise make a collision mesh
            if (this.mesh.shareMeshes)
            {
                world.chunkHasMadeCollisionMesh = true;
                applyCollisionMesh = false;
                meshCollider.sharedMesh = filter.mesh;
                return;
            }

            world.chunkHasMadeCollisionMesh = true;
            //Applying the mesh takes the longest but nothing can be dont with the mesh class in a
secondary thread...thanks Unity

            //makes a new mesh setting the name for convenience
            Mesh mesh = new Mesh()
            {
                name = "Collider Mesh",
                vertices = this.mesh.colVerts.ToArray(),
                triangles = this.mesh.colTris.ToArray()
            };

            //recalcs the normals and applies the mesh
            mesh.RecalculateNormals();

            meshCollider.sharedMesh = mesh;

            applyCollisionMesh = false;
        }
        #endregion
    }
}
```

4.3 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/Chunks/MeshData.cs File Reference

Classes

- class BeeGame.Terrain.Chunks.MeshData

  The data for a Chunks's Mesh

Namespaces

- namespace BeeGame.Terrain.Chunks

4.4 MeshData.cs

```
using System.Collections.Generic;
using UnityEngine;
using BeeGame.Core.Enums;
using BeeGame.Core;

namespace BeeGame.Terrain.Chunks
{
    public class MeshData
    {
        public List<Vector3> verts = new List<Vector3>();
        public List<int> tris = new List<int>();
        public List<Vector2> uv = new List<Vector2>();

        public List<Vector3> colVerts = new List<Vector3>();
        public List<int> colTris = new List<int>();

        public bool shareMeshes = true;

        public bool done = false;

        public void AddQuadTriangles(bool addToRenderMesh = true)
        {
            //*adds the triangles in an anticlockwise order

            if (addToRenderMesh)
            {
                tris.Add(verts.Count - 4);
                tris.Add(verts.Count - 3);
                tris.Add(verts.Count - 2);
                tris.Add(verts.Count - 4);
                tris.Add(verts.Count - 2);
                tris.Add(verts.Count - 1);
            }

            colTris.Add(colVerts.Count - 4);
            colTris.Add(colVerts.Count - 3);
            colTris.Add(colVerts.Count - 2);
            colTris.Add(colVerts.Count - 4);
            colTris.Add(colVerts.Count - 2);
            colTris.Add(colVerts.Count - 1);
        }

        public void AddVertices(THVector3 pos, bool addToRenderMesh = true,
      Direction direction = Direction.DOWN)
        {
            if (addToRenderMesh)
                verts.Add(pos);

            //*if the vertice is on the top face make its positon slightly smaller
            if(direction == Direction.UP)
```

```
                colVerts.Add(pos - new THVector3(0.01f, 0, 0.01f));
        }

        public void AddTriangle(int tri)
        {
            tris.Add(tri);

            colTris.Add(tri - (verts.Count - colVerts.Count));
        }
    }
}
```

4.5 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/Chunks/LoadChunks.cs File Reference

Classes

- class BeeGame.Terrain.Chunks.LoadChunks

  Loads the Chunks around the player

Namespaces

- namespace BeeGame.Terrain.Chunks

4.6 LoadChunks.cs

```
using System;
using System.Collections.Generic;
using UnityEngine;
using BeeGame.Terrain.LandGeneration;

namespace BeeGame.Terrain.Chunks
{
    public class LoadChunks : MonoBehaviour
    {
        public World world;

        private List<ChunkWorldPos> buildList = new List<ChunkWorldPos>();

        private static ChunkWorldPos[] chunkPositions = new
ChunkWorldPos[] {   new ChunkWorldPos( 0, 0,  0), new
ChunkWorldPos(-1, 0,  0), new ChunkWorldPos( 0, 0, -1), new
ChunkWorldPos( 0, 0,  1), new ChunkWorldPos( 1, 0,  0),
                             new ChunkWorldPos(-1, 0, -1), new
ChunkWorldPos(-1, 0,  1), new ChunkWorldPos( 1, 0, -1), new
ChunkWorldPos( 1, 0,  1), new ChunkWorldPos(-2, 0,  0),
                             new ChunkWorldPos( 0, 0, -2), new
ChunkWorldPos( 0, 0,  2), new ChunkWorldPos( 2, 0,  0), new
ChunkWorldPos(-2, 0, -1), new ChunkWorldPos(-2, 0,  1),
                             new ChunkWorldPos(-1, 0, -2), new
ChunkWorldPos(-1, 0,  2), new ChunkWorldPos( 1, 0, -2), new
ChunkWorldPos( 1, 0,  2), new ChunkWorldPos( 2, 0, -1),
                             new ChunkWorldPos( 2, 0,  1), new
ChunkWorldPos(-2, 0, -2), new ChunkWorldPos(-2, 0,  2), new
ChunkWorldPos( 2, 0, -2), new ChunkWorldPos( 2, 0,  2),
                             new ChunkWorldPos(-3, 0,  0), new
ChunkWorldPos( 0, 0, -3), new ChunkWorldPos( 0, 0,  3), new
ChunkWorldPos( 3, 0,  0), new ChunkWorldPos(-3, 0, -1),
                             new ChunkWorldPos(-3, 0,  1), new
ChunkWorldPos(-1, 0, -3), new ChunkWorldPos(-1, 0,  3), new
ChunkWorldPos( 1, 0, -3), new ChunkWorldPos( 1, 0,  3),
                             new ChunkWorldPos( 3, 0, -1), new
ChunkWorldPos( 3, 0,  1), new ChunkWorldPos(-3, 0, -2), new
ChunkWorldPos(-3, 0,  2), new ChunkWorldPos(-2, 0, -3),
                             new ChunkWorldPos(-2, 0,  3), new
ChunkWorldPos( 2, 0, -3), new ChunkWorldPos( 2, 0,  3), new
ChunkWorldPos( 3, 0, -2), new ChunkWorldPos( 3, 0,  2),
                             new ChunkWorldPos(-4, 0,  0), new
ChunkWorldPos( 0, 0, -4), new ChunkWorldPos( 0, 0,  4), new
ChunkWorldPos( 4, 0,  0), new ChunkWorldPos(-4, 0, -1),
                             new ChunkWorldPos(-4, 0,  1), new
ChunkWorldPos(-1, 0, -4), new ChunkWorldPos(-1, 0,  4), new
```

```
    ChunkWorldPos( 1, 0, -4), new ChunkWorldPos( 1, 0,  4),
                                  new ChunkWorldPos( 4, 0, -1), new
    ChunkWorldPos( 4, 0,  1), new ChunkWorldPos(-3, 0, -3), new
    ChunkWorldPos(-3, 0,  3), new ChunkWorldPos( 3, 0, -3),
                                  new ChunkWorldPos( 3, 0,  3), new
    ChunkWorldPos(-4, 0, -2), new ChunkWorldPos(-4, 0,  2), new
    ChunkWorldPos(-2, 0, -4), new ChunkWorldPos(-2, 0,  4),
                                  new ChunkWorldPos( 2, 0, -4), new
    ChunkWorldPos( 2, 0,  4), new ChunkWorldPos( 4, 0, -2), new
    ChunkWorldPos( 4, 0,  2), new ChunkWorldPos(-5, 0,  0),
                                  new ChunkWorldPos(-4, 0, -3), new
    ChunkWorldPos(-4, 0,  3), new ChunkWorldPos(-3, 0, -4), new
    ChunkWorldPos(-3, 0,  4), new ChunkWorldPos( 0, 0, -5),
                                  new ChunkWorldPos( 0, 0,  5), new
    ChunkWorldPos( 3, 0, -4), new ChunkWorldPos( 3, 0,  4), new
    ChunkWorldPos( 4, 0, -3), new ChunkWorldPos( 4, 0,  3),
                                  new ChunkWorldPos( 5, 0,  0), new
    ChunkWorldPos(-5, 0, -1), new ChunkWorldPos(-5, 0,  1), new
    ChunkWorldPos(-1, 0, -5), new ChunkWorldPos(-1, 0,  5),
                                  new ChunkWorldPos( 1, 0, -5), new
    ChunkWorldPos( 1, 0,  5), new ChunkWorldPos( 5, 0, -1), new
    ChunkWorldPos( 5, 0,  1), new ChunkWorldPos(-5, 0, -2),
                                  new ChunkWorldPos(-5, 0,  2), new
    ChunkWorldPos(-2, 0, -5), new ChunkWorldPos(-2, 0,  5), new
    ChunkWorldPos( 2, 0, -5), new ChunkWorldPos( 2, 0,  5),
                                  new ChunkWorldPos( 5, 0, -2), new
    ChunkWorldPos( 5, 0,  2), new ChunkWorldPos(-4, 0, -4), new
    ChunkWorldPos(-4, 0,  4), new ChunkWorldPos( 4, 0, -4),
                                  new ChunkWorldPos( 4, 0,  4), new
    ChunkWorldPos(-5, 0, -3), new ChunkWorldPos(-5, 0,  3), new
    ChunkWorldPos(-3, 0, -5), new ChunkWorldPos(-3, 0,  5),
                                  new ChunkWorldPos( 3, 0, -5), new
    ChunkWorldPos( 3, 0,  5), new ChunkWorldPos( 5, 0, -3), new
    ChunkWorldPos( 5, 0,  3), new ChunkWorldPos(-6, 0,  0),
                                  new ChunkWorldPos( 0, 0, -6), new
    ChunkWorldPos( 0, 0,  6), new ChunkWorldPos( 6, 0,  0), new
    ChunkWorldPos(-6, 0, -1), new ChunkWorldPos(-6, 0,  1),
                                  new ChunkWorldPos(-1, 0, -6), new
    ChunkWorldPos(-1, 0,  6), new ChunkWorldPos( 1, 0, -6), new
    ChunkWorldPos( 1, 0,  6), new ChunkWorldPos( 6, 0, -1),
                                  new ChunkWorldPos( 6, 0,  1), new
    ChunkWorldPos(-6, 0, -2), new ChunkWorldPos(-6, 0,  2), new
    ChunkWorldPos(-2, 0, -6), new ChunkWorldPos(-2, 0,  6),
                                  new ChunkWorldPos( 2, 0, -6), new
    ChunkWorldPos( 2, 0,  6), new ChunkWorldPos( 6, 0, -2), new
    ChunkWorldPos( 6, 0,  2), new ChunkWorldPos(-5, 0, -4),
                                  new ChunkWorldPos(-5, 0,  4), new
    ChunkWorldPos(-4, 0, -5), new ChunkWorldPos(-4, 0,  5), new
    ChunkWorldPos( 4, 0, -5), new ChunkWorldPos( 4, 0,  5),
                                  new ChunkWorldPos( 5, 0, -4), new
    ChunkWorldPos( 5, 0,  4), new ChunkWorldPos(-6, 0, -3), new
    ChunkWorldPos(-6, 0,  3), new ChunkWorldPos(-3, 0, -6),
                                  new ChunkWorldPos(-3, 0,  6), new
    ChunkWorldPos( 3, 0, -6), new ChunkWorldPos( 3, 0,  6), new
    ChunkWorldPos( 6, 0, -3), new ChunkWorldPos( 6, 0,  3),
                                  new ChunkWorldPos(-7, 0,  0), new
    ChunkWorldPos( 0, 0, -7), new ChunkWorldPos( 0, 0,  7), new
    ChunkWorldPos( 7, 0,  0), new ChunkWorldPos(-7, 0, -1),
                                  new ChunkWorldPos(-7, 0,  1), new
    ChunkWorldPos(-5, 0, -5), new ChunkWorldPos(-5, 0,  5), new
    ChunkWorldPos(-1, 0, -7), new ChunkWorldPos(-1, 0,  7),
                                  new ChunkWorldPos( 1, 0, -7), new
    ChunkWorldPos( 1, 0,  7), new ChunkWorldPos( 5, 0, -5), new
    ChunkWorldPos( 5, 0,  5), new ChunkWorldPos( 7, 0, -1),
                                  new ChunkWorldPos( 7, 0,  1), new
    ChunkWorldPos(-6, 0, -4), new ChunkWorldPos(-6, 0,  4), new
    ChunkWorldPos(-4, 0, -6), new ChunkWorldPos(-4, 0,  6),
                                  new ChunkWorldPos( 4, 0, -6), new
    ChunkWorldPos( 4, 0,  6), new ChunkWorldPos( 6, 0, -4), new
    ChunkWorldPos( 6, 0,  4), new ChunkWorldPos(-7, 0, -2),
                                  new ChunkWorldPos(-7, 0,  2), new
    ChunkWorldPos(-2, 0, -7), new ChunkWorldPos(-2, 0,  7), new
    ChunkWorldPos( 2, 0, -7), new ChunkWorldPos( 2, 0,  7),
                                  new ChunkWorldPos( 7, 0, -2), new
    ChunkWorldPos( 7, 0,  2), new ChunkWorldPos(-7, 0, -3), new
    ChunkWorldPos(-7, 0,  3), new ChunkWorldPos(-3, 0, -7),
                                  new ChunkWorldPos(-3, 0,  7), new
    ChunkWorldPos( 3, 0, -7), new ChunkWorldPos( 3, 0,  7), new
    ChunkWorldPos( 7, 0, -3), new ChunkWorldPos( 7, 0,  3),
                                  new ChunkWorldPos(-6, 0, -5), new
    ChunkWorldPos(-6, 0,  5), new ChunkWorldPos(-5, 0, -6), new
    ChunkWorldPos(-5, 0,  6), new ChunkWorldPos( 5, 0, -6),
                                  new ChunkWorldPos( 5, 0,  6), new
    ChunkWorldPos( 6, 0, -5), new ChunkWorldPos( 6, 0,  5) };

            private static ChunkWorldPos[] nearbyChunks = new
    ChunkWorldPos[] { new ChunkWorldPos(0, 0, 0), new
```

```
ChunkWorldPos(1, 0, 0), new ChunkWorldPos(-1, 0, 0), new ChunkWorldPos(0, 0, 1), new ChunkWorldPos(0, 0, -1),
                                                                                        new ChunkWorldPos(1, 0, 1), new ChunkWorldPos(1, 0, -1), new ChunkWorldPos(-1, 0, 1), new ChunkWorldPos(-1, 0, -1)};

        private static int timer = 0;

        private void Start()
        {
            LandGeneration.Terrain.world = world;
        }

        void Update()
        {
            if (DeleteChunks())
                return;
            if (!world.chunkHasMadeCollisionMesh)
            {
                FindChunksToLoad();
                LoadAndRenderChunks();
                ApplyCollsionMeshToNearbyChunks();
            }
            //stops chunks being made and collision meshes being made at the same time
            world.chunkHasMadeCollisionMesh = false;
        }

        void ApplyCollsionMeshToNearbyChunks()
        {
            //gets the player position in chunk coordinates
            ChunkWorldPos playerPos = new ChunkWorldPos(Mathf.FloorToInt(transform.position.x / Chunk.chunkSize) * Chunk.chunkSize, Mathf.FloorToInt(transform.position.y / Chunk.chunkSize) * Chunk.chunkSize, Mathf.FloorToInt(transform.position.z / Chunk.chunkSize) * Chunk.chunkSize);

            for (int i = 0; i < nearbyChunks.Length; i++)
            {
                ChunkWorldPos chunkPos = new ChunkWorldPos(nearbyChunks[i].x * Chunk.chunkSize + playerPos.x, 0, nearbyChunks[i].z * Chunk.chunkSize + playerPos.z);

                for (int j = -1; j < 2; j++)
                {
                    Chunk nearbyChunk = world.GetChunk(chunkPos.x, j * Chunk.chunkSize, chunkPos.z);

                    if (nearbyChunk != null)
                        nearbyChunk.applyCollisionMesh = true;
                }
            }
        }

        void LoadAndRenderChunks()
        {
            //if their is somethign in the build list new chunks can be made
            if (buildList.Count != 0)
            {
                //makes all of the chunks in the build list. Works backwards through the list so that no chunk is missed because chunks are removed from the list as they are made
                for (int i = buildList.Count - 1, j = 0; i >= 0 && j < 8; i--, j++)
                {
                    BuildChunk(buildList[0]);
                    buildList.RemoveAt(0);
                }
            }
        }

        void FindChunksToLoad()
        {
            if (buildList.Count == 0)
            {
                //gets the player position in chunk coordinates
                ChunkWorldPos playerPos = new ChunkWorldPos(Mathf.FloorToInt(transform.position.x / Chunk.chunkSize) * Chunk.chunkSize, Mathf.FloorToInt(transform.position.y / Chunk.chunkSize) * Chunk.chunkSize, Mathf.FloorToInt(transform.position.z / Chunk.chunkSize) * Chunk.chunkSize);

                //check all of the chunk positions and if that position does not have a chunk in it make it
                for (int i = 0; i < chunkPositions.Length; i++)
                {
                    ChunkWorldPos newChunkPos = new ChunkWorldPos(chunkPositions[i].x * Chunk.chunkSize + playerPos.x, 0, chunkPositions[i].z * Chunk.chunkSize + playerPos.z);

                    Chunk newChunk = world.GetChunk(newChunkPos.x, newChunkPos.y, newChunkPos.z);

                    if (newChunk != null && (newChunk.rendered || buildList.Contains(newChunkPos)))
                        continue;

                    for (int y = -1; y < 2; y++)
                    {
                        for (int x = newChunkPos.x - Chunk.chunkSize; x < newChunkPos.x + Chunk.chunkSize; x += Chunk.chunkSize)
                        {
                            for (int z = newChunkPos.z - Chunk.chunkSize; z < newChunkPos.z + Chunk.chunkSize; z += Chunk.chunkSize)
                            {
                                buildList.Add(new ChunkWorldPos(x, y * Chunk.chunkSize, z));
                            }
                        }
                    }
                    return;
                }
            }
        }

        void BuildChunk(ChunkWorldPos pos)
        {
            if (world.GetChunk(pos.x, pos.y, pos.z) == null)
                world.CreateChunk(pos.x, pos.y, pos.z);
        }

        bool DeleteChunks()
        {
            //destroys every 10 call to reduce load on CPU so that chunks are not destroyed and created at the same time
            if(timer == 10)
            {
                timer = 0;
                var chunksToDelete = new List<ChunkWorldPos>();

                //go through all of the built chunks and if the chunk is 256 units away it is assumed to be out of sight so is added to the destroy list
                foreach (var chunk in world.chunks)
                {
                    float distance = Vector3.Distance(chunk.Value.transform.position, transform.position);

                    if (distance > 256)
                        chunksToDelete.Add(chunk.Key);
                }

                foreach (var chunk in chunksToDelete)
                {
                    world.DestroyChunk(chunk.x, chunk.y, chunk.z);
                }

                return true;
            }

            timer++;

            return false;
        }
    }
}
```

4.7 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/Chunks/Save↩ Chunk.cs File Reference

Classes

- class BeeGame.Terrain.Chunks.SaveChunk

  Saves a Chunks modified Blocks for save optimisation

Namespaces

- namespace BeeGame.Terrain.Chunks

4.8 SaveChunk.cs

```
using System;
using System.Collections.Generic;
using BeeGame.Blocks;


namespace BeeGame.Terrain.Chunks
{
    [Serializable]
    public class SaveChunk
    {
        public Dictionary<ChunkWorldPos, Block> blocks = new Dictionary<ChunkWorldPos, Block>();

        public SaveChunk(Block[,,] blockArray)
        {
            for (int x = 0; x < Chunk.chunkSize; x++)
            {
                for (int y = 0; y < Chunk.chunkSize; y++)
                {
                    for (int z = 0; z < Chunk.chunkSize; z++)
                    {
                        //*if the block has changed save it
                        if (blockArray[x, y, z].changed)
                            blocks.Add(new ChunkWorldPos(x, y, z), blockArray[x, y, z]);
                    }
                }
            }
        }
    }
}
```

4.9 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/ChunkWorldPos.cs File Reference

Classes

- struct BeeGame.Terrain.ChunkWorldPos

  Serializable int version of THVector3

Namespaces

- namespace BeeGame.Terrain

4.10 ChunkWorldPos.cs

```
using System;
using BeeGame.Core;

namespace BeeGame.Terrain
{
    [Serializable]
    public struct ChunkWorldPos
    {
        public int x, y, z;

        public ChunkWorldPos(int x, int y, int z)
        {
            this.x = x;
            this.y = y;
            this.z = z;
        }

        public override string ToString()
        {
            return $"({x}, {y}, {z})";
        }

        //*TODO probly add the == and != but for now this is fine
        [System.Diagnostics.CodeAnalysis.SuppressMessage("Microsoft.Usage", "
CA2231:OverloadOperatorEqualsOnOverridingValueTypeEquals")]
        public override bool Equals(object obj)
        {
            //possibly remove and just check if obj is null
            if (!(obj is ChunkWorldPos))
                return false;

            ChunkWorldPos temp = (ChunkWorldPos)obj;

            //possibly change to hashcode checking
            if (temp.x == x && temp.y == y && temp.z == z)
                return true;

            return false;
        }

        public override int GetHashCode()
        {
            unchecked
            {
                int hashcode = 47;

                hashcode *= 227 + x.GetHashCode();
                hashcode *= 227 + y.GetHashCode();
                hashcode *= 227 + z.GetHashCode();

                return hashcode;
            }
        }

        public static implicit operator THVector3(ChunkWorldPos pos)
        {
            return new THVector3(pos.x, pos.y, pos.z);
        }

        public static explicit operator ChunkWorldPos(THVector3 pos)
        {
            return new ChunkWorldPos((int)pos.x, (int)pos.y, (int)pos.
z);
        }
    }
}
```

4.11 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/LandGeneration/↩ World.cs File Reference

Classes

- class BeeGame.Terrain.LandGeneration.World

  Allows inter Chunk communication as it stores a list of active chunks

Namespaces

- namespace BeeGame.Terrain.LandGeneration

4.12 World.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using UnityEngine;
using BeeGame.Terrain.Chunks;
using BeeGame.Blocks;

namespace BeeGame.Terrain.LandGeneration
{
    public class World : MonoBehaviour
    {
        #region Data
        public Dictionary<ChunkWorldPos, Chunk> chunks = new Dictionary<ChunkWorldPos, Chunk>();

        public GameObject chunkPrefab;

        public bool chunkHasMadeCollisionMesh = false;
        #endregion

        #region Creation and Destruction
        #region Chunk
        public void CreateChunk(int x, int y, int z)
        {
            //*pos of the chunk
            ChunkWorldPos pos = new ChunkWorldPos(x, y, z);

            //*makes the chunk at the given position
            GameObject newChunk = Instantiate(chunkPrefab, new Vector3(x, y, z), Quaternion.identity);

            Chunk chunk = newChunk.GetComponent<Chunk>();

            //*setting the chunks pos and a reference to this
            chunk.chunkWorldPos = pos;
            chunk.world = this;

            //*adds the nwe chunk to the dictionary
            chunks.Add(pos, chunk);

            //*generates the new chunks blocks
            chunk = new TerrainGeneration().ChunkGen(chunk);

            //loads any blocks that the chunk has had modified
            Serialization.Serialization.LoadChunk(chunk);

            //*updates all chunks around this one to reduce drawing of unecisary faces
            chunks.TryGetValue(new ChunkWorldPos(x, y - 16, z), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x, y, z - 16), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x - 16, y, z), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x, y + 16, z), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x, y, z + 16), out chunk);
            if (chunk != null)
                chunk.update = true;

            chunks.TryGetValue(new ChunkWorldPos(x + 16, y, z), out chunk);
            if (chunk != null)
                chunk.update = true;
            //*the chunk will then make its meshes
        }

        public void DestroyChunk(int x, int y, int z)
        {
            //*if teh chnks exists destroy it
            if (chunks.TryGetValue(new ChunkWorldPos(x, y, z), out Chunk chunk))
            {
                //*saves the chunk before destroying it incase any block were changed in it
                Serialization.Serialization.SaveChunk(chunk);
                Destroy(chunk.gameObject);
                chunks.Remove(new ChunkWorldPos(x, y, z));
            }
        }
        #endregion

        #region Block
        public void SetBlock(int x, int y, int z, Block block, bool saveChunk = false)
        {
            //*gets the chunk for the block to be placed in
            Chunk chunk = GetChunk(x, y, z);

            //*if the chunk is not null and the block trying to be replaced is replaceable, replace it
            if(chunk != null && chunk.blocks[x - chunk.chunkWorldPos.x, y - chunk.chunkWorldPos.y, z - chunk.chunkWorldPos.z].breakable)
            {

                chunk.SetBlock(x - chunk.chunkWorldPos.x, y - chunk.chunkWorldPos.y, z - chunk.chunkWorldPos.z, block);
                chunk.update = true;

                //*updates the nebouring chunks as when a block is broken it may be in the edje of the chunk so their meshes also need to be updated
                //*only updates chunks that need to be updated as not every chunk will need to be and sometines none of them will need to be

                //*checks if the block chaged is in the edge if the x value for the chunk
                UpdateIfEqual(x - chunk.chunkWorldPos.x, 0, new ChunkWorldPos(x - 1, y, z));
                UpdateIfEqual(x - chunk.chunkWorldPos.x, Chunk.chunkSize - 1, new ChunkWorldPos(x + 1, y, z));

                //*checks if the block chaged is in the edge if the y value for the chunk
                UpdateIfEqual(y - chunk.chunkWorldPos.y, 0, new ChunkWorldPos(x, y - 1, z));
                UpdateIfEqual(y - chunk.chunkWorldPos.y, Chunk.chunkSize - 1, new ChunkWorldPos(x, y + 1, z));

                //*checks if the block chaged is in the edge if the z value for the chunk
                UpdateIfEqual(z - chunk.chunkWorldPos.z, 0, new ChunkWorldPos(x, y, z - 1));
                UpdateIfEqual(z - chunk.chunkWorldPos.z, Chunk.chunkSize - 1, new ChunkWorldPos(x, y, z + 1));

                if (saveChunk)
                    Serialization.Serialization.SaveChunk(chunk);
            }
        }
        #endregion
        #endregion

        #region Get Things
        public Chunk GetChunk(int x, int y, int z)
        {
            float multiple = Chunk.chunkSize;
            //*rounds the given x, y, z to a multiple of 16 as chunks are 16x16x16 in size
            ChunkWorldPos pos = new ChunkWorldPos()
            {
                x = Mathf.FloorToInt(x / multiple) * Chunk.chunkSize,
                y = Mathf.FloorToInt(y / multiple) * Chunk.chunkSize,
                z = Mathf.FloorToInt(z / multiple) * Chunk.chunkSize
            };

            //*gets the chunk if it exists
            chunks.TryGetValue(pos, out Chunk chunk);
            //*if the chunk does not exist will return null
            return chunk;
        }

        public Block GetBlock(int x, int y, int z)
        {
            //*gets the chunk that the block is in
            Chunk chunk = GetChunk(x, y, z);

            if(chunk != null)
            {
                //*gets the block in the chunk
                return chunk.GetBlock(x - chunk.chunkWorldPos.x, y - chunk.chunkWorldPos.y, z - chunk.chunkWorldPos.z);
            }

            //*returns an empty block is the chunk was not found
            return new Air();
        }
        #endregion

        void UpdateIfEqual(int value1, int value2, ChunkWorldPos pos)
        {
            if(value1 == value2)
            {
                Chunk chunk = GetChunk(pos.x, pos.y, pos.z);

                if (chunk != null)
                    chunk.update = true;
            }
        }
    }
}
```

4.13 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/LandGeneration/Terrain.cs File Reference

Classes

- class BeeGame.Terrain.LandGeneration.Terrain

    Should use as an interface between the rest of the game and the terrain

Namespaces

- namespace BeeGame.Terrain.LandGeneration

4.14 Terrain.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using UnityEngine;
using BeeGame.Terrain.Chunks;
using BeeGame.Blocks;
using BeeGame.Core;

namespace BeeGame.Terrain.LandGeneration
{
    public class Terrain
    {
        public static World world;

        #region Setting Position To block Grid
        public static ChunkWorldPos GetBlockPos(THVector3 pos)
        {
            return new ChunkWorldPos()
            {
                x = Mathf.RoundToInt(pos.x),
                y = Mathf.RoundToInt(pos.y),
                z = Mathf.RoundToInt(pos.z)
            };
        }

        public static THVector3 GetBlockPos(RaycastHit hit)
        {
            THVector3 vec3 = new THVector3()
            {
                x = RoundXZ(hit.point.x, hit.normal.x),
                y = RoundY(hit.point.y, hit.normal.y),
                z = RoundXZ(hit.point.z, hit.normal.z)
            };
            return (vec3);
        }

        public static ChunkWorldPos GetBlockPosFromRayCast(RaycastHit
hit)
        {
            return new ChunkWorldPos((int)RoundXZ(hit.point.x, hit.normal.x), (int)RoundY(hit.
point.y, hit.normal.y), (int)RoundXZ(hit.point.z, hit.normal.z));
        }

        static float RoundXZ(float pos, float normal)
        {
            //*if we are looking at + x/z vlaues
            if (pos > 0)
            {
                if (normal > 0)
                {
                    pos = (int)pos;
                    return pos;
                }
                else if (normal < 0)
                {
                    pos = (int)pos;
                    return pos - -1;
                }
                else
                {
                    if ((pos - (int)pos) > 0.5)
                    {
                        return (int)pos + 1;
                    }
                    return (int)pos;
                }
            }
            //*if we are looking at - x/z values
            else
            {
                //*if poitive normal
                if (normal > 0)
                {
                    pos = (int)pos;
                    return pos - 1;
                }

                //*if negative nomrmal
                if (normal < 0)
                {
                    pos = (int)pos;
                    return pos;
                }
                //*if their is no normal

                //*if pos is greater than 0.5 we are in the next block so go to it
                if ((-pos - (int)-pos) > 0.5)
                {
                    return (int)pos - 1;
                }

                return (int)pos;
            }
        }

        static float RoundY(float pos, float normal)
        {
            pos = (float)Math.Round(pos, 1);
            if (pos >= 0)
            {
                if(normal > 0)
                {
                    if((int)pos % 2 == 0)
                        return Mathf.RoundToInt((float)Math.Round(pos, 1));

                    return Mathf.RoundToInt((float)Math.Round(pos, 1)) - normal;
                }

                if((int)pos % 2 == 0)
                    return Mathf.RoundToInt((float)Math.Round(pos, 1)) - normal;

                return Mathf.RoundToInt((float)Math.Round(pos, 1));
            }

            if(pos <= 0)
            {
                if (normal > 0)
                {
                    if ((int)pos % 2 == 0)
                        //*the Math.Round removes strange rounding errors shown with Mathf.Round eg
sometimes 0.5 would round to 0 not 1
                        return Mathf.RoundToInt((float)Math.Round(pos, 1)) - normal;

                    return Mathf.RoundToInt((float)Math.Round(pos, 1));// - normal;
                }

                if ((int)pos % 2 == 0)
                    return Mathf.RoundToInt((float)Math.Round(pos, 1));

                return Mathf.RoundToInt((float)Math.Round(pos, 1)) - normal;
            }


            return Mathf.RoundToInt((float)Math.Round(pos, 1));
        }

        public static float Round(float pos, float norm, bool adjacent = false)
        {
            if(pos - (int)pos == 0.5f || pos - (int)pos == -0.5f)
            {
                if(adjacent)
                {
                    pos += (norm / 2);
                }
                else
                {
                    pos -= (norm / 2);
                }
            }

            return pos;
        }
        #endregion

        #region Get Block
        public static ChunkWorldPos GetBlockPos(RaycastHit hit, bool adjacent = false)
        {
            return GetBlockPos(new THVector3()
            {
                //*rounds the hit to the correct position
                x = Round(hit.point.x, hit.normal.x, adjacent),
                y = Round(hit.point.y, hit.normal.y, adjacent),
                z = Round(hit.point.z, hit.normal.z, adjacent)
            });
        }

        public static Block GetBlock(RaycastHit hit, bool adjacent = false)
        {
            //*checks that a chunk was hit and if it wasnt return early
            Chunk chunk = hit.collider.GetComponent<Chunk>();

            if (chunk == null)
                return null;

            //*allignes the hit to the block grid and returns the block
            ChunkWorldPos pos = GetBlockPos(hit, adjacent);

            return chunk.world.GetBlock(pos.x, pos.y, pos.z);
        }

        public static Block GetBlock(THVector3 pos)
        {
            Chunk chunk = GetChunk(pos);

            if (chunk == null)
                return new Air();

            chunk.world.GetBlock((int)pos.x, (int)pos.y, (int)pos.z);

            return new Block();
        }

        public static bool BlockInPosition(THVector3 pos, Chunk chunk)
        {
            if (chunk == null)
                return false;

            if (chunk.GetBlock((int)pos.x, (int)pos.y, (int)pos.z) != new Air())
                return true;

            return false;
        }
        #endregion

        public static Chunk GetChunk(THVector3 vec3)
        {
            return world.GetChunk((int)vec3.x, (int)vec3.y, (int)vec3.z);
        }

        #region Set Block
        public static bool SetBlock(RaycastHit hit, Block block, bool adjacent = false)
        {
            //*checks that a chnk was hit
            Chunk chunk = hit.collider.GetComponent<Chunk>();

            if (chunk == null)
                return false;

            //*alligns the hit to the block grid
            ChunkWorldPos pos = GetBlockPosFromRayCast(hit);

            //*checks that the block tryign to be replaced can be replaced eg bedrock cannot be replaced
            if (GetBlock(hit, adjacent).breakable)
            {
                //*sets the position of the block and saves the chunk
                chunk.world.SetBlock(pos.x, pos.y, pos.z, block);
                Serialization.Serialization.SaveChunk(chunk);
            }

            return true;
        }
        #endregion
    }
}
```

4.15 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/LandGeneration/↩ TerrainGeneration.cs File Reference

Classes

- class BeeGame.Terrain.LandGeneration.TerrainGeneration

  Generates the terrain for the game

Namespaces

- namespace BeeGame.Terrain.LandGeneration

4.16 TerrainGeneration.cs

```
using UnityEngine;
using BeeGame.Terrain.Chunks;
using BeeGame.Terrain.LandGeneration.Noise;
using BeeGame.Serialization;
using System.Collections.Generic;
using System.Threading;

namespace BeeGame.Terrain.LandGeneration
{
    public class TerrainGeneration
    {
        #region Data
        private float stoneBaseHeight = -24;
        private float stoneBaseNoise = 0.05f;
        private float stoneBaseNoiseHeight = 4;

        private float stoneMountainHeight = 48;
        private float stoneMountainFrequency = 0.008f;
        private float stoneMinHeight = -12;

        private float dirtBaseHeight = 1;
        private float dirtNoise = 0.04f;
        private float dirtNoiseHeight = 3;

        private float caveFrequency = 0.025f;
        private int caveSize = 8;
        #endregion

        public Chunk ChunkGen(Chunk chunk)
        {
            Chunk outChunk = chunk;
            lock (chunk)
            {
                Thread thread = new Thread(() => ChunkGenThread(chunk, out outChunk)) { Name = $"Generate
 Chunk Thread @ {chunk.chunkWorldPos}"};

                thread.Start();
                return outChunk;
            }
        }

        public void ChunkGenThread(Chunk chunk, out Chunk outChunk)
        {
            //*for each x and z position in teh chunk
            for (int x = chunk.chunkWorldPos.x; x < chunk.
chunkWorldPos.x + Chunk.chunkSize; x++)
            {
                for (int z = chunk.chunkWorldPos.z; z < chunk.
chunkWorldPos.z + Chunk.chunkSize; z++)
                {
                    chunk = GenChunkColum(chunk, x, z);
                }
            }

            chunk.SetBlocksUnmodified();
            outChunk = chunk;
        }

        public Chunk GenChunkColum(Chunk chunk, int x, int z)
        {
            //*the height of the mountain
            int stoneHeight = Mathf.FloorToInt(stoneBaseHeight);
            stoneHeight += GetNoise(-x, 0, z, stoneMountainFrequency, Mathf.FloorToInt(stoneMountainHeight));

            //*if the colum is currenly to low make it not so low
            if (stoneHeight < stoneMinHeight)
                stoneHeight = Mathf.FloorToInt(stoneMinHeight);

            //*add the height of normal stone on to the mountain
            stoneHeight += GetNoise(x, 0, -z, stoneBaseNoise, Mathf.RoundToInt(stoneBaseNoiseHeight));

            //*put dirt on top
            int dirtHeight = stoneHeight + Mathf.FloorToInt(dirtBaseHeight);
            dirtHeight += GetNoise(x, 100, z, dirtNoise, Mathf.FloorToInt(dirtNoiseHeight));

            //*set the colum to the correct blocks
            for (int y = chunk.chunkWorldPos.y; y < chunk.chunkWorldPos.y + Chunk.chunkSize; y ++)
            {
                int caveChance = GetNoise(x + 40, y + 100, z - 50, caveFrequency, 200);

                //*puts a layer of bedrock at the botton the the world
                if (y <= (chunk.chunkWorldPos.y) && chunk.chunkWorldPos.y == -16)
                {
                    SetBlock(x, y, z, new Blocks.Bedrock(), chunk);
                }
                else if (y <= stoneHeight && caveSize < caveChance)
                {
                    SetBlock(x, y, z, new Blocks.Block(), chunk);
                }
                else if (y <= dirtHeight && caveSize < caveChance)
                {
                    SetBlock(x, y, z, new Blocks.Grass(), chunk);
                }
                else
                {
                    SetBlock(x, y, z, new Blocks.Air(), chunk);
                }
            }

                return chunk;
        }

        public static int GetNoise(int x, int y, int z, float scale, int max)
        {
            return Mathf.FloorToInt((SimplexNoise.Generate(x * scale, y * scale, z * scale) + 1f) * (max / 2f));
        }

        public static void SetBlock(int x, int y, int z, Blocks.Block block, Chunk chunk, bool replacesBlocks = false)
        {
            //*corrects the x, y, z pos of the so that the block is placed in the correct position
            x -= chunk.chunkWorldPos.x;
            y -= chunk.chunkWorldPos.y;
            z -= chunk.chunkWorldPos.z;

            //*chechs that the block is in the chunk and that no block is already their then sets it
            if (Chunk.InRange(x) && Chunk.InRange(y) && Chunk.InRange(z))
                if (replacesBlocks || chunk.blocks[x, y, z] == null)
                    chunk.SetBlock(x, y, z, block);
        }
    }
}
```

4.17 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Terrain/LandGeneration/↩ Noise/SimplexNoise.cs File Reference

Classes

- class BeeGame.Terrain.LandGeneration.Noise.SimplexNoise

  Implementation of the Perlin simplex noise, an improved Perlin noise algorithm. Based loosely on SimplexNoise1234 by Stefan Gustavson <`http://`**staffwww.itn.liu.se/∼stegu/aqsis/aqsis-newnoise/>*

Namespaces

- namespace BeeGame.Terrain.LandGeneration.Noise

4.18 SimplexNoise.cs

```
//* SimplexNoise for C#
//* Author: Heikki Törmälä

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namespace BeeGame.Terrain.LandGeneration.Noise
{
    public class SimplexNoise
    {
        public static float Generate(float x)
        {
            int i0 = FastFloor(x);
            int i1 = i0 + 1;
            float x0 = x - i0;
            float x1 = x0 - 1.0f;

            float n0, n1;

            float t0 = 1.0f - x0 * x0;
            t0 *= t0;
            n0 = t0 * t0 * grad(perm[i0 & 0xff], x0);

            float t1 = 1.0f - x1 * x1;
            t1 *= t1;
            n1 = t1 * t1 * grad(perm[i1 & 0xff], x1);
            //* The maximum value of this noise is 8*(3/4)^4 = 2.53125
            //* A factor of 0.395 scales to fit exactly within [-1,1]
            return 0.395f * (n0 + n1);
        }

        public static float Generate(float x, float y)
        {
            const float F2 = 0.366025403f; //* F2 = 0.5*(sqrt(3.0)-1.0)
            const float G2 = 0.211324865f; //* G2 = (3.0-Math.sqrt(3.0))/6.0

            float n0, n1, n2; //* Noise contributions from the three corners

            //* Skew the input space to determine which simplex cell we're in
            float s = (x + y) * F2; //* Hairy factor for 2D
            float xs = x + s;
            float ys = y + s;
            int i = FastFloor(xs);
            int j = FastFloor(ys);

            float t = (float)(i + j) * G2;
            float X0 = i - t; //* Unskew the cell origin back to (x,y) space
            float Y0 = j - t;
            float x0 = x - X0; //* The x,y distances from the cell origin
            float y0 = y - Y0;

            //* For the 2D case, the simplex shape is an equilateral triangle.
            //* Determine which simplex we are in.
            int i1, j1; //* Offsets for second (middle) corner of simplex in (i,j) coords
            if (x0 > y0) { i1 = 1; j1 = 0; } //* lower triangle, XY order: (0,0)->(1,0)->(1,1)
            else { i1 = 0; j1 = 1; }      //* upper triangle, YX order: (0,0)->(0,1)->(1,1)

            //* A step of (1,0) in (i,j) means a step of (1-c,-c) in (x,y), and
            //* a step of (0,1) in (i,j) means a step of (-c,1-c) in (x,y), where
            //* c = (3-sqrt(3))/6

            float x1 = x0 - i1 + G2; //* Offsets for middle corner in (x,y) unskewed coords
            float y1 = y0 - j1 + G2;
            float x2 = x0 - 1.0f + 2.0f * G2; //* Offsets for last corner in (x,y) unskewed coords
            float y2 = y0 - 1.0f + 2.0f * G2;

            //* Wrap the integer indices at 256, to avoid indexing perm[] out of bounds
            int ii = i % 256;
            int jj = j % 256;

            //* Calculate the contribution from the three corners
            float t0 = 0.5f - x0 * x0 - y0 * y0;
            if (t0 < 0.0f) n0 = 0.0f;
            else
            {
                t0 *= t0;
                n0 = t0 * t0 * grad(perm[ii + perm[jj]], x0, y0);
            }

            float t1 = 0.5f - x1 * x1 - y1 * y1;
            if (t1 < 0.0f) n1 = 0.0f;
            else
            {
                t1 *= t1;
                n1 = t1 * t1 * grad(perm[ii + i1 + perm[jj + j1]], x1, y1);
            }

            float t2 = 0.5f - x2 * x2 - y2 * y2;
            if (t2 < 0.0f) n2 = 0.0f;
            else
            {
                t2 *= t2;
                n2 = t2 * t2 * grad(perm[ii + 1 + perm[jj + 1]], x2, y2);
            }

            //* Add contributions from each corner to get the final noise value.
            //* The result is scaled to return values in the interval [-1,1].
            return 40.0f * (n0 + n1 + n2); //* TODO: The scale factor is preliminary!
        }


        public static float Generate(float x, float y, float z)
        {
            //* Simple skewing factors for the 3D case
            const float F3 = 0.333333333f;
            const float G3 = 0.166666667f;

            float n0, n1, n2, n3; //* Noise contributions from the four corners

            //* Skew the input space to determine which simplex cell we're in
            float s = (x + y + z) * F3; //* Very nice and simple skew factor for 3D
            float xs = x + s;
            float ys = y + s;
            float zs = z + s;
            int i = FastFloor(xs);
            int j = FastFloor(ys);
            int k = FastFloor(zs);

            float t = (float)(i + j + k) * G3;
            float X0 = i - t; //* Unskew the cell origin back to (x,y,z) space
            float Y0 = j - t;
            float Z0 = k - t;
            float x0 = x - X0; //* The x,y,z distances from the cell origin
            float y0 = y - Y0;
            float z0 = z - Z0;

            //* For the 3D case, the simplex shape is a slightly irregular tetrahedron.
            //* Determine which simplex we are in.
            int i1, j1, k1; //* Offsets for second corner of simplex in (i,j,k) coords
            int i2, j2, k2; //* Offsets for third corner of simplex in (i,j,k) coords

            /* This code would benefit from a backport from the GLSL version! */
            if (x0 >= y0)
            {
                if (y0 >= z0)
                { i1 = 1; j1 = 0; k1 = 0; i2 = 1; j2 = 1; k2 = 0; } //* X Y Z order
                else if (x0 >= z0) { i1 = 1; j1 = 0; k1 = 0; i2 = 1; j2 = 0; k2 = 1; } //* X Z Y order
                else { i1 = 0; j1 = 0; k1 = 1; i2 = 1; j2 = 0; k2 = 1; } //* Z X Y order
            }
            else
            { //* x0<y0
                if (y0 < z0) { i1 = 0; j1 = 0; k1 = 1; i2 = 0; j2 = 1; k2 = 1; } //* Z Y X order
                else if (x0 < z0) { i1 = 0; j1 = 1; k1 = 0; i2 = 0; j2 = 1; k2 = 1; } //* Y Z X order
                else { i1 = 0; j1 = 1; k1 = 0; i2 = 1; j2 = 1; k2 = 0; } //* Y X Z order
            }

            //* A step of (1,0,0) in (i,j,k) means a step of (1-c,-c,-c) in (x,y,z),
            //* a step of (0,1,0) in (i,j,k) means a step of (-c,1-c,-c) in (x,y,z), and
            //* a step of (0,0,1) in (i,j,k) means a step of (-c,-c,1-c) in (x,y,z), where
            //* c = 1/6.

            float x1 = x0 - i1 + G3; //* Offsets for second corner in (x,y,z) coords
            float y1 = y0 - j1 + G3;
            float z1 = z0 - k1 + G3;
            float x2 = x0 - i2 + 2.0f * G3; //* Offsets for third corner in (x,y,z) coords
            float y2 = y0 - j2 + 2.0f * G3;
            float z2 = z0 - k2 + 2.0f * G3;
            float x3 = x0 - 1.0f + 3.0f * G3; //* Offsets for last corner in (x,y,z) coords
            float y3 = y0 - 1.0f + 3.0f * G3;
            float z3 = z0 - 1.0f + 3.0f * G3;

            //* Wrap the integer indices at 256, to avoid indexing perm[] out of bounds
            int ii = Mod(i, 256);
            int jj = Mod(j, 256);
            int kk = Mod(k, 256);

            //* Calculate the contribution from the four corners
            float t0 = 0.6f - x0 * x0 - y0 * y0 - z0 * z0;
            if (t0 < 0.0f) n0 = 0.0f;
            else
            {
                t0 *= t0;
                n0 = t0 * t0 * grad(perm[ii + perm[jj + perm[kk]]], x0, y0, z0);
            }

            float t1 = 0.6f - x1 * x1 - y1 * y1 - z1 * z1;
            if (t1 < 0.0f) n1 = 0.0f;
            else
            {
                t1 *= t1;
                n1 = t1 * t1 * grad(perm[ii + i1 + perm[jj + j1 + perm[kk + k1]]], x1, y1, z1);
            }

            float t2 = 0.6f - x2 * x2 - y2 * y2 - z2 * z2;
            if (t2 < 0.0f) n2 = 0.0f;
            else
            {
                t2 *= t2;
                n2 = t2 * t2 * grad(perm[ii + i2 + perm[jj + j2 + perm[kk + k2]]], x2, y2, z2);
            }

            float t3 = 0.6f - x3 * x3 - y3 * y3 - z3 * z3;
            if (t3 < 0.0f) n3 = 0.0f;
            else
            {
                t3 *= t3;
                n3 = t3 * t3 * grad(perm[ii + 1 + perm[jj + 1 + perm[kk + 1]]], x3, y3, z3);
            }

            //* Add contributions from each corner to get the final noise value.
            //* The result is scaled to stay just inside [-1,1]
            return 32.0f * (n0 + n1 + n2 + n3); //* TODO: The scale factor is preliminary!
        }

        public static byte[] perm = new byte[512] { 151,160,137,91,90,15,
              131,13,201,95,96,53,194,233,7,225,140,36,103,30,69,142,8,99,37,240,21,10,23,
              190, 6,148,247,120,234,75,0,26,197,62,94,252,219,203,117,35,11,32,57,177,33,
              88,237,149,56,87,174,20,125,136,171,168, 68,175,74,165,71,134,139,48,27,166,
              77,146,158,231,83,111,229,122,60,211,133,230,220,105,92,41,55,46,245,40,244,
              102,143,54, 65,25,63,161, 1,216,80,73,209,76,132,187,208, 89,18,169,200,196,
              135,130,116,188,159,86,164,100,109,198,173,186, 3,64,52,217,226,250,124,123,
              5,202,38,147,118,126,255,82,85,212,207,206,59,227,47,16,58,17,182,189,28,42,
              223,183,170,213,119,248,152, 2,44,154,163, 70,221,153,101,155,167, 43,172,9,
              129,22,39,253, 19,98,108,110,79,113,224,232,178,185, 112,104,218,246,97,228,
              251,34,242,193,238,210,144,12,191,179,162,241, 81,51,145,235,249,14,239,107,
              49,192,214, 31,181,199,106,157,184, 84,204,176,115,121,50,45,127, 4,150,254,
              138,236,205,93,222,114,67,29,24,72,243,141,128,195,78,66,215,61,156,180,
              151,160,137,91,90,15,
              131,13,201,95,96,53,194,233,7,225,140,36,103,30,69,142,8,99,37,240,21,10,23,
              190, 6,148,247,120,234,75,0,26,197,62,94,252,219,203,117,35,11,32,57,177,33,
              88,237,149,56,87,174,20,125,136,171,168, 68,175,74,165,71,134,139,48,27,166,
              77,146,158,231,83,111,229,122,60,211,133,230,220,105,92,41,55,46,245,40,244,
              102,143,54, 65,25,63,161, 1,216,80,73,209,76,132,187,208, 89,18,169,200,196,
              135,130,116,188,159,86,164,100,109,198,173,186, 3,64,52,217,226,250,124,123,
              5,202,38,147,118,126,255,82,85,212,207,206,59,227,47,16,58,17,182,189,28,42,
              223,183,170,213,119,248,152, 2,44,154,163, 70,221,153,101,155,167, 43,172,9,
              129,22,39,253, 19,98,108,110,79,113,224,232,178,185, 112,104,218,246,97,228,
              251,34,242,193,238,210,144,12,191,179,162,241, 81,51,145,235,249,14,239,107,
              49,192,214, 31,181,199,106,157,184, 84,204,176,115,121,50,45,127, 4,150,254,
              138,236,205,93,222,114,67,29,24,72,243,141,128,195,78,66,215,61,156,180
            };

        private static int FastFloor(float x)
        {
            return (x > 0) ? ((int)x) : (((int)x) - 1);
        }

        private static int Mod(int x, int m)
        {
            int a = x % m;
            return a < 0 ? a + m : a;
        }

        private static float grad(int hash, float x)
        {
            int h = hash & 15;
            float grad = 1.0f + (h & 7);   //* Gradient value 1.0, 2.0, ..., 8.0
            if ((h & 8) != 0) grad = -grad;         //* Set a random sign for the gradient
            return (grad * x);           //* Multiply the gradient with the distance
        }

        private static float grad(int hash, float x, float y)
        {
            int h = hash & 7;      //* Convert low 3 bits of hash code
            float u = h < 4 ? x : y;  //* into 8 simple gradient directions,
            float v = h < 4 ? y : x;  //* and compute the dot product with (x,y).
            return ((h & 1) != 0 ? -u : u) + ((h & 2) != 0 ? -2.0f * v : 2.0f * v);
        }

        private static float grad(int hash, float x, float y, float z)
        {
            int h = hash & 15;     //* Convert low 4 bits of hash code into 12 simple
            float u = h < 8 ? x : y; //* gradient directions, and compute dot product.
            float v = h < 4 ? y : h == 12 || h == 14 ? x : z; //* Fix repeats at h = 12 to 15
            return ((h & 1) != 0 ? -u : u) + ((h & 2) != 0 ? -v : v);
        }

        private static float grad(int hash, float x, float y, float z, float t)
        {
            int h = hash & 31;      //* Convert low 5 bits of hash code into 32 simple
            float u = h < 24 ? x : y; //* gradient directions, and compute dot product.
            float v = h < 16 ? y : z;
            float w = h < 8 ? z : t;
            return ((h & 1) != 0 ? -u : u) + ((h & 2) != 0 ? -v : v) + ((h & 4) != 0 ? -w : w);
        }
    }
}
```

5 Player

5.1 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Player/PlayerLook.cs File Reference

Classes

- class BeeGame.Player.PlayerLook

  The look for the player

Namespaces

- namespace BeeGame.Player

5.2 PlayerLook.cs

```
using UnityEngine;
using BeeGame.Core;

namespace BeeGame.Player
{
    public class PlayerLook : MonoBehaviour
    {
        #region Data
        public Transform myTransform;
        public Transform cameraTransform;
        [Range(0, 360)]
        public float rotationLock;
        public float speed = 5;
        float yRot = 0;
        float xRot = 0;
        #endregion

        #region Unity Methods
        void Start()
        {
            Cursor.lockState = CursorLockMode.Locked;
            Cursor.visible = false;
        }

        void Update()
        {
            //*the look wil not update when a inventory GUI is open
            if (!THInput.isAnotherInventoryOpen)
            {
                Look();
            }
        }
        #endregion

        #region Methods
        void Look()
        {
            //Only X/Y rotation needed as Z rotation would be wierd
            yRot += Input.GetAxis("Mouse X") * speed * Time.timeScale;
            xRot -= Input.GetAxis("Mouse Y") * speed * Time.timeScale;

            //clamps the X rotation so the player camera cannot do flips
            xRot = Mathf.Clamp(xRot, -rotationLock, rotationLock);

            myTransform.rotation = Quaternion.Euler(0, yRot, 0);
            cameraTransform.localRotation = Quaternion.Euler(xRot, 0, 0);
        }
        #endregion
    }
}
```

5.3 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Player/PlayerMove.cs File Reference

Classes

- class BeeGame.Player.PlayerMove

    Moves the player

Namespaces

- namespace BeeGame.Player

5.4 PlayerMove.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using UnityEngine;
using BeeGame.Core;

namespace BeeGame.Player
{
    [RequireComponent(typeof(Rigidbody))]
    public class PlayerMove : MonoBehaviour
    {
        #region Data
        public float speed = 10f;
        public float gravity = 9.81f;
        public float maxVelocity = 10f;
        private bool canJump = false;
        public float jumpHeight = 2f;

        private Rigidbody myRigidBody;
        #endregion

        #region Unity Methods
        private void Awake()
        {
            myRigidBody = GetComponent<Rigidbody>();

            //i want to use myown gravity and rotation
            myRigidBody.useGravity = false;
            myRigidBody.freezeRotation = true;
        }

        void FixedUpdate()
        {
            //If the player is grounded it can move
            if (canJump)
            {
                MovePlayer();
            }

            //adds the downward force
            myRigidBody.AddForce(new Vector3(0, myRigidBody.mass * -gravity, 0));
        }

        private void OnCollisionStay(Collision collision)
        {
            canJump = true;
        }
        #endregion

        #region Movement Methods
        void MovePlayer()
        {
            //Calculate the speed we want to achive
            Vector3 targetVelocity = new Vector3(THInput.GetAxis("Horizontal"), 0,
THInput.GetAxis("Vertical"));
            targetVelocity = transform.TransformDirection(targetVelocity);
            targetVelocity *= speed;

            //Apply a force to reach the target speed
            Vector3 velocity = myRigidBody.velocity;
            Vector3 velocityChange = (targetVelocity - velocity);

            //Clamping the velocity so that the player does not infinatly accelerate
            velocityChange.x = Mathf.Clamp(velocityChange.x, -maxVelocity, maxVelocity);
            velocityChange.z = Mathf.Clamp(velocityChange.z, -maxVelocity, maxVelocity);
            velocityChange.y = 0;

            //Adds the force to the player so they move in the correct direction
            myRigidBody.AddForce(velocityChange, ForceMode.Impulse);

            //Jumping
            if (canJump && THInput.GetButton("Jump"))
            {
                canJump = false;
                myRigidBody.velocity = new Vector3(velocity.x, VerticalJumpSpeed(), velocity.z);
            }
        }

        float VerticalJumpSpeed()
        {
            //*Gets the correct of fore required for the player to reach the desired apex
            //*Can this be done without Square Root as that take alot of work?
            return Mathf.Sqrt(2 * jumpHeight * gravity);
        }
        #endregion
    }
}
```

5.5 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Player/Selector.cs File Reference

Classes

- class BeeGame.Player.Selector

  Moves the Block selector

Namespaces

- namespace BeeGame.Player

5.6 Selector.cs

```
using UnityEngine;
using BeeGame.Blocks;
using BeeGame.Terrain.Chunks;
using BeeGame.Inventory.Player_Inventory;
using BeeGame.Items;
using static BeeGame.Terrain.LandGeneration.Terrain;
using static BeeGame.Core.THInput;

namespace BeeGame.Player
{
    public class Selector : MonoBehaviour
    {
        #region Data
        public GameObject selector;

        public LayerMask layers;
        private RaycastHit hit;

        public int selectedHotbarSlot = 27;
        #endregion

        #region Unity Methods
        void Awake()
        {
            selector = Instantiate(selector);
        }

        void FixedUpdate()
        {
            if(!isAnotherInventoryOpen)
                UpdateSelector();
        }

        void Update()
        {
            if (!isAnotherInventoryOpen)
            {
                if (GetButtonDown("Break Block"))
                    BreakBlock();
                if (GetButtonDown("Place"))
                    PlaceBlock();
            }
        }
        #endregion

        #region Update
        void UpdateSelector()
        {
            if (Physics.Raycast(transform.position, transform.forward, out hit, 15, layers))
            {
                selector.SetActive(true);
                selector.transform.position = GetBlockPos(hit);
                //*selector.SetActive(BlockInPosition(GetBlockPos(hit),
  hit.collider.GetComponent<Chunk>()));
            }
            else
            {
                selector.SetActive(false);
            }
            SelectedSlot();
        }

        void SelectedSlot()
        {
            //* adds 1 to the selected slot and if that is out of range set it to the first hotbar slot
            if(Input.GetAxis("Mouse ScrollWheel") > 0)
            {
                selectedHotbarSlot += 1;
                if (selectedHotbarSlot == 36)
                    selectedHotbarSlot = 27;
            }
            //* removes one from the hotbar selector and if the selector would be inside the inventory set
  it to the last slot in the hotbar
            else if (Input.GetAxis("Mouse ScrollWheel") < 0)
            {
                selectedHotbarSlot -= 1;
                if (selectedHotbarSlot == 26)
                    selectedHotbarSlot = 35;
            }

            transform.parent.GetComponentInChildren<PlayerInventory>().SelectedSlot(selectedHotbarSlot);
        }
        #endregion

        #region Break/Place
        void BreakBlock()
        {
            Chunk chunk = GetChunk(selector.transform.position);

            Block block = chunk.world.GetBlock((int)selector.transform.position.x, (int)selector.transform.position.y, (int)selector.transform.position.z);

            if (!block.breakable)
                return;

            chunk.world.SetBlock((int)selector.transform.position.x, (int)selector.transform.position.y, (int)selector.transform.position.z, new Air(), true);
            //* set to changed so when block is placed down again it will be saved
            block.changed = true;
            block.BreakBlock(selector.transform.position);
        }

        void PlaceBlock()
        {
            Chunk chunk = GetChunk(selector.transform.position);

            if (chunk == null)
                return;

            //* gets the item in the hotbar and if the item is placeable place it
            if(transform.parent.GetComponentInChildren<PlayerInventory>().GetItemFromHotBar(selectedHotbarSlot, out Item blockToPlace))
                chunk.world.SetBlock((int)(selector.transform.position.x + hit.normal.x), (int)(selector.transform.position.y + hit.normal.y), (int)(selector.transform.position.z + hit.normal.z), (Block)blockToPlace, true);
        }
        #endregion
    }
}
```

6 Resources

6.1 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/PrefabDictionary.cs File Reference

Classes

- class BeeGame.Core.PrefabDictionary

  The prefabs avaliable to the game

Namespaces

- namespace BeeGame.Core

6.2 PrefabDictionary.cs

```
using System.Collections.Generic;
using UnityEngine;

namespace BeeGame.Core
{
    public static class PrefabDictionary
    {
        private static Dictionary<string, GameObject> prefabDictionary = new Dictionary<string, GameObject>
();

        public static void LoadPrefabs()
        {
            prefabDictionary = Resources.Resources.GetPrefabs();
        }

        public static GameObject GetPrefab(string prefab)
        {
            return prefabDictionary[prefab];
        }
    }
}
```

6.3 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/SpriteDictionary.cs File Reference

Classes

- class BeeGame.Core.SpriteDictionary

  All of the sprites avaliable to the game

Namespaces

- namespace BeeGame.Core

6.4 SpriteDictionary.cs

```
using System.Collections.Generic;
using UnityEngine;

namespace BeeGame.Core
{
    public static class SpriteDictionary
    {
        private static Dictionary<string, Sprite> itemSpriteDictionary = new Dictionary<string, Sprite>();

        public static Sprite GetSprite(string spriteName)
        {
            itemSpriteDictionary.TryGetValue(spriteName, out Sprite sprite);

            if (sprite == null)
                return new Sprite();

            return sprite;
        }

        public static void LoadSprites()
        {
            itemSpriteDictionary = Resources.Resources.GetSprites();
        }
    }
}
```

6.5 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Resources/Resources.Designer.↩ cs File Reference

Classes

- class BeeGame.Resources.Resources

  A strongly-typed resource class, for looking up localized strings, etc.

Namespaces

- namespace BeeGame.Resources

6.6 Resources.Designer.cs

```
//*------------------------------------------------------------------------------
//* <auto-generated>
//*     This code was generated by a tool.
//*     Runtime Version:4.0.30319.42000
//*
//*     Changes to this file may cause incorrect behavior and will be lost if
//*     the code is regenerated.
//* </auto-generated>
//*------------------------------------------------------------------------------

namespace BeeGame.Resources {
    using System;
    using System.Collections.Generic;
    using UnityEngine;

    //* This class was auto-generated by the StronglyTypedResourceBuilder
    //* class via a tool like ResGen or Visual Studio.
    //* To add or remove a member, edit your .ResX file then rerun ResGen
    //* with the /str option, or rebuild your VS project.
    [global::System.CodeDom.Compiler.GeneratedCodeAttribute("System.Resources.Tools.StronglyTypedResourceBuilder", "4.0.0.0")]
    [global::System.Diagnostics.DebuggerNonUserCodeAttribute()]
    [global::System.Runtime.CompilerServices.CompilerGeneratedAttribute()]
    internal class Resources {

        private static global::System.Resources.ResourceManager resourceMan;

        private static global::System.Globalization.CultureInfo resourceCulture;

        [global::System.Diagnostics.CodeAnalysis.SuppressMessageAttribute("Microsoft.Performance", "CA1811:AvoidUncalledPrivateCode")]
        internal Resources() {
        }

        [global::System.ComponentModel.EditorBrowsableAttribute(global::System.ComponentModel.EditorBrowsableState.Advanced)]
        internal static global::System.Resources.ResourceManager ResourceManager {
            get {
                if (object.ReferenceEquals(resourceMan, null)) {
                    global::System.Resources.ResourceManager temp = new global::System.Resources.ResourceManager("BeeGame.Resources.Resources", typeof(Resources).Assembly);
                    resourceMan = temp;
                }
                return resourceMan;
            }
        }

        [global::System.ComponentModel.EditorBrowsableAttribute(global::System.ComponentModel.EditorBrowsableState.Advanced)]
        internal static global::System.Globalization.CultureInfo Culture {
            get {
                return resourceCulture;
            }
            set {
                resourceCulture = value;
            }
        }

        internal static byte[] Prefabs {
            get {
                object obj = ResourceManager.GetObject("Prefabs", resourceCulture);
                return ((byte[])(obj));
            }
        }

        internal static byte[] Sprites {
            get {
                object obj = ResourceManager.GetObject("Sprites", resourceCulture);
                return ((byte[])(obj));
            }
        }

        internal static Dictionary<string, Sprite> GetSprites()
        {
            string[] splitCharacters = new string[] { "," };
            object obj = ResourceManager.GetObject("Sprites", resourceCulture);

            string text = System.Text.Encoding.Default.GetString((byte[])obj);
            string lineText = "";
            string[] splitText;
            Texture2D tex;
            Dictionary<string, Sprite> sprites = new Dictionary<string, Sprite>();

            for (int i = 0; i < text.Length; i++)
            {
                if (text[i] != '\n')
                {
                    lineText += text[i];
                }
                else
                {
                    splitText = lineText.Split(splitCharacters, StringSplitOptions.RemoveEmptyEntries);
                    lineText = "";
                    tex = UnityEngine.Resources.Load("Sprites/" + splitText[1]) as Texture2D;
                    sprites.Add(splitText[0], Sprite.Create(tex, new UnityEngine.Rect(0, 0, tex.
width, tex.height), Vector2.zero));
                }
            }

            splitText = lineText.Split(splitCharacters, StringSplitOptions.RemoveEmptyEntries);
            lineText = "";
            tex = UnityEngine.Resources.Load("Sprites/" + splitText[1]) as Texture2D;
            sprites.Add(splitText[0], Sprite.Create(tex, new UnityEngine.Rect(0, 0, tex.width,
tex.height), Vector2.zero));

            return sprites;
        }

        internal static Dictionary<string, GameObject> GetPrefabs()
        {
            string[] splitCharacters = new string[] { "," };
            object obj = ResourceManager.GetObject("Prefabs", resourceCulture);

            string text = System.Text.Encoding.Default.GetString((byte[])obj);
            text = text.Remove(0, 3);
            string lineText = "";
            string[] splitText;
            Dictionary<string, GameObject> objects = new Dictionary<string, GameObject>();

            for (int i = 0; i < text.Length; i++)
            {
                if(text[i] != '\n')
                {
                    lineText += text[i];
                }
                else
                {
                    splitText = lineText.Split(splitCharacters, StringSplitOptions.RemoveEmptyEntries);
                    lineText = "";
                    objects.Add(splitText[0], UnityEngine.Resources.Load("Prefabs/" + splitText[
1]) as GameObject);
                }
            }

            splitText = lineText.Split(splitCharacters, StringSplitOptions.RemoveEmptyEntries);
            lineText = "";
            objects.Add(splitText[0], UnityEngine.Resources.Load("Prefabs/" + splitText[1]) as
GameObject);

            return objects;
        }
    }
}
```

6.7 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/LoadResources.cs File Reference

Classes

- class BeeGame.LoadResources

    Loads all of the resources in the game

Namespaces

- namespace BeeGame

6.8 LoadResources.cs

```
using UnityEngine;
using BeeGame.Core;

namespace BeeGame
{
    public class LoadResources : MonoBehaviour
    {
        void Awake()
        {
            Serialization.Serialization.MakeDirectorys();
            SpriteDictionary.LoadSprites();
            PrefabDictionary.LoadPrefabs();
        }
    }
}
```

7 Unity Type & Method Replacements

7.1 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/UnityTypeReplacements/↩ THInput.cs File Reference

Classes

- class BeeGame.Core.THInput

  My implementation of the unity input system. Acts as a buffer layer to the unity system so that the input keys can be changed at runtime

Namespaces

- namespace BeeGame.Core

7.2 THInput.cs

```
using System;
using System.Collections.Generic;
using UnityEngine;

namespace BeeGame.Core
{
    public static class THInput
    {
        private static Dictionary<string, object> inputButtons = new Dictionary<string, object>()
        {
            {"Forward" , KeyCode.W},
            {"Backward", KeyCode.S },
            {"Right", KeyCode.D },
            {"Left", KeyCode.A },
            {"Player Inventory", KeyCode.E },
            {"Quest Book", KeyCode.Mouse1 },
            {"Interact", KeyCode.Mouse1 },
            {"Place", KeyCode.Mouse1 },
            {"Break Block", KeyCode.Mouse0 },
            {"Close Menu/Inventory", new KeyCode[2] { KeyCode.Escape, KeyCode.E } },
            {"Jump", KeyCode.Space }
        };

        public static bool isAnotherInventoryOpen;

        public static bool GetButtonDown(string button)
        {
            if (!inputButtons.ContainsKey(button))
            {
                throw new Exception("Input Manager: Key button name not defined: " + button);
            }

            switch (inputButtons[button])
            {
                case KeyCode[] arry:
                    //*for each posible key, check if it was pressed and if it was return that it was, if none of them was poressed return false
                    foreach (var item in arry)
                    {
                        if (Input.GetKeyDown(item))
                        {
                            return true;
                        }
                    }

                    return false;
                default:
                    return Input.GetKeyDown((KeyCode)inputButtons[button]);
            }
        }

        public static bool GetButton(string button)
        {
            if (!inputButtons.ContainsKey(button))
            {
                throw new Exception("Input Manager: Key button name not defined: " + button);
            }

            switch (inputButtons[button])
            {
                case KeyCode[] arry:
                    //*for each posible key, check if it was pressed and if it was return that it was, if none of them was poressed return false
                    foreach (var item in arry)
                    {
                        if (Input.GetKey(item))
                        {
                            return true;
                        }
                    }

                    return false;
                default:
                    return Input.GetKey((KeyCode)inputButtons[button]);
            }
        }

        public static bool GetButtonUp(string button)
        {
            if (!inputButtons.ContainsKey(button))
            {
                throw new Exception("Input Manager: Key button name not defined: " + button);
            }

            switch (inputButtons[button])
            {
                case KeyCode[] arry:
                    //*for each posible key, check if it was pressed and if it was return that it was, if none of them was poressed return false
                    foreach (var item in arry)
                    {
                        if (Input.GetKeyUp(item))
                        {
                            return true;
                        }
                    }

                    return false;
                default:
                    return Input.GetKeyUp((KeyCode)inputButtons[button]);
            }
        }

        public static int GetAxis(string axis)
        {
            int returnAxis = 0;

            if (axis == "Horizontal")
            {
                if (GetButton("Right"))
                {
                    returnAxis += 1;
                }

                if (GetButton("Left"))
                {
                    returnAxis -= 1;
                }
            }
            else if (axis == "Vertical")
            {
                if (GetButton("Forward"))
                {
                    returnAxis += 1;
                }

                if (GetButton("Backward"))
                {
                    returnAxis -= 1;
                }
            }

            return returnAxis;
        }
    }
}
```

7.3 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/UnityTypeReplacements/↩ THVector2.cs File Reference

Classes

- struct BeeGame.Core.THVector2

    Serilializable version of Vector2

Namespaces

- namespace BeeGame.Core

7.4 THVector2.cs

```
using System;
using UnityEngine;

namespace BeeGame.Core
{
    [Serializable]
    public struct THVector2
    {
        #region Data
        public float x;
        public float y;
        #endregion

        #region Constructor
        public THVector2(float x, float y)
        {
            this.x = x;
            this.y = y;
        }

        public THVector2(THVector2 vec2)
        {
            this = vec2;
        }

        public THVector2(Vector2 vec2)
        {
            this = vec2;
        }
        #endregion

        #region Overrides
        public override bool Equals(object obj)
        {
            if (!(obj is THVector2))
                return false;
            if (obj.GetHashCode() == GetHashCode())
                return true;
            return false;
        }
        public override int GetHashCode()
        {
            unchecked
            {
                int hash = 13;

                hash *= 443 * x.GetHashCode();
                hash *= 373 * y.GetHashCode();

                return hash;
            }
        }

        public override string ToString()
        {
            return $"{x}, {y}";
        }

        public static bool operator ==(THVector2 a, THVector2 b)
        {
            return a.Equals(b);
        }
        public static bool operator !=(THVector2 a, THVector2 b)
        {
            return !(a == b);
        }

        public static THVector2 operator +(THVector2 a, THVector2 b)
        {
            a.x += b.x;
            a.y += b.y;

            return a;
        }
        public static THVector2 operator +(THVector2 a, float b)
        {
            a.x += b;
            a.y += b;

            return a;
        }
        public static THVector2 operator +(float a, THVector2 b)
        {
            return new THVector2(a + b.x, a + b.y);
        }
        public static THVector2 operator -(THVector2 a, THVector2 b)
        {
            a.x -= b.x;
            a.y -= b.y;

            return a;
        }
        public static THVector2 operator -(THVector2 a, float b)
        {
            a.x += b;
            a.y += b;

            return a;
        }
        public static THVector2 operator -(float a, THVector2 b)
        {
            return new THVector2(a - b.x, a - b.y);
        }
        public static THVector2 operator *(THVector2 a, THVector2 b)
        {
            a.x *= b.x;
            a.y *= b.y;

            return a;
        }
        public static THVector2 operator *(THVector2 a, float b)
        {
            a.x *= b;
            a.y *= b;

            return a;
        }
        public static THVector2 operator *(float a, THVector2 b)
        {
            return new THVector2(a * b.x, a * b.y);
        }
        public static THVector2 operator /(THVector2 a, THVector2 b)
        {
            a.x /= b.x;
            a.y /= b.y;

            return a;
        }
        public static THVector2 operator /(THVector2 a, float b)
        {
            a.x /= b;
            a.y /= b;

            return a;
        }
        public static THVector2 operator /(float a, THVector2 b)
        {
            return new THVector2(a / b.x, a / b.y);
        }
        #endregion

        #region Implicit Operators
        public static implicit operator Vector2(THVector2 vec2)
        {
            return new Vector2(vec2.x, vec2.y);
        }

        public static implicit operator THVector2(Vector2 vec2)
        {
            return new THVector2(vec2.x, vec2.y);
        }
        #endregion
    }
}
```

7.5 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/UnityTypeReplacements/↩ THVector3.cs File Reference

Classes

- struct BeeGame.Core.THVector3

  Serializable version of Vector3

Namespaces

- namespace BeeGame.Core

7.6 THVector3.cs

```
using System;
using UnityEngine;

namespace BeeGame.Core
{
    [Serializable]
    public struct THVector3
    {
        #region Data
        public float x;
        public float y;
        public float z;
        #endregion

        #region Constructors
        public THVector3(float x, float y, float z)
        {
            this.x = x;
            this.y = y;
            this.z = z;
        }

        public THVector3(THVector3 vec3)
        {
            this = vec3;
        }

        public THVector3(Vector3 vec3)
        {
            this = vec3;
        }

        public THVector3(Terrain.ChunkWorldPos vec3)
        {
            this = vec3;
        }
        #endregion

        #region Methods
        public static float Distance(THVector3 a, THVector3 b)
        {
            return (float)Math.Sqrt(Math.Pow((a.x - b.x), 2) + Math.Pow((a.y - b.y), 2) + Math.Pow((a.z - b.z), 2));
        }
        #endregion

        #region Overrides
        public override bool Equals(object obj)
        {
            if (!(obj is THVector3))
                return false;
            if (obj.GetHashCode() == GetHashCode())
                return true;
            return false;
        }

        public override int GetHashCode()
        {
            unchecked
            {
                int hash = 13;

                hash *= 443 * x.GetHashCode();
                hash *= 373 * y.GetHashCode();
                hash *= 127 * z.GetHashCode();

                return hash;
            }
        }

        public override string ToString()
        {
            return $"{x}, {y}, {z}";
        }

        public static bool operator ==(THVector3 a, THVector3 b)
        {
            return a.Equals(b);
        }
        public static bool operator !=(THVector3 a, THVector3 b)
        {
            return !(a == b);
        }

        public static THVector3 operator +(THVector3 a, THVector3 b)
        {
            a.x += b.x;
            a.y += b.y;
            a.z += b.z;

            return a;
        }
        public static THVector3 operator +(THVector3 a, float b)
        {
            a.x += b;
            a.y += b;
            a.z += b;

            return a;
        }
        public static THVector3 operator +(float a, THVector3 b)
        {
            return new THVector3(a + b.x, a + b.y, a + b.z);
        }
        public static THVector3 operator -(THVector3 a, THVector3 b)
        {
            a.x -= b.x;
            a.y -= b.y;
            a.z -= b.z;

            return a;
        }
        public static THVector3 operator -(THVector3 a, float b)
        {
            a.x += b;
            a.y += b;
            a.z += b;

            return a;
        }
        public static THVector3 operator -(float a, THVector3 b)
        {
            return new THVector3(a - b.x, a - b.y, a - b.z);
        }
        public static THVector3 operator *(THVector3 a, THVector3 b)
        {
            a.x *= b.x;
            a.y *= b.y;
            a.z *= b.z;

            return a;
        }
        public static THVector3 operator *(THVector3 a, float b)
        {
            a.x *= b;
            a.y *= b;
            a.z *= b;

            return a;
        }
        public static THVector3 operator *(float a, THVector3 b)
        {
            return new THVector3(a * b.x, a * b.y, a * b.z);
        }
        public static THVector3 operator /(THVector3 a, THVector3 b)
        {
            a.x /= b.x;
            a.y /= b.y;
            a.z /= b.z;

            return a;
        }
        public static THVector3 operator /(THVector3 a, float b)
        {
            a.x /= b;
            a.y /= b;
            a.z /= b;

            return a;
        }
        public static THVector3 operator /(float a, THVector3 b)
        {
            return new THVector3(a / b.x, a / b.y, a / b.z);
        }
        #endregion

        #region Implicit Operators
        public static implicit operator Vector3(THVector3 vec3)
        {
            return new Vector3(vec3.x, vec3.y, vec3.z);
        }

        public static implicit operator THVector3(Vector3 vec3)
        {
            return new THVector3(vec3.x, vec3.y, vec3.z);
        }
        #endregion
    }
}
```

8 Misc

8.1 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Serialization/Serialization.cs File Reference

Classes

- class BeeGame.Serialization.Serialization

Serializes and Deserialises things

Namespaces

- namespace BeeGame.Serialization

8.2 Serialization.cs

```
using System.IO;
using System.Runtime.Serialization;
using System.Runtime.Serialization.Formatters.Binary;
using UnityEngine;
using BeeGame.Terrain;
using BeeGame.Terrain.Chunks;
using BeeGame.Inventory;
using BeeGame.Blocks;

namespace BeeGame.Serialization
{
    public static class Serialization
    {
        #region Data
        public static string worldName = "World";
        public static string saveFolderName = "Saves";
        private static string savePath;
        #endregion

        public static void MakeDirectorys()
        {
            savePath = $"{Application.dataPath}/{saveFolderName}/{worldName}";

            if (!(Directory.Exists(savePath)))
                Directory.CreateDirectory(savePath);
        }

        #region Inventorys
        public static void SerializeInventory(Inventory.Inventory inventory, string inventoryName)
        {
            string inventorySavePath = $"{savePath}/Inventorys";

            if (!Directory.Exists(inventorySavePath))
                Directory.CreateDirectory(inventorySavePath);

            SaveFile(inventory.GetAllItems(), $"{inventorySavePath}/{inventoryName}.dat");
        }

        public static void DeSerializeInventory(Inventory.Inventory inventory,
   string inventoryName)
        {
            //* make the path
            string inventorySavePath = $"{savePath}/Inventorys/{inventoryName}.dat";

            //* checks that the file exists
            if (!File.Exists(inventorySavePath))
                return;

            inventory.SetAllItems((ItemsInInventory)LoadFile($"{inventorySavePath}"));
        }
        #endregion

        #region Chunk
        public static void SaveChunk(Chunk chunk)
        {
            //* saves the blocks
            SaveChunk save = new SaveChunk(chunk.blocks);

            //* if no block was changed return early
            if (save.blocks.Count == 0)
                return;

            //* otherwise save the file
            string saveFile = $"{savePath}/{FileName(chunk.chunkWorldPos)}.dat";

            SaveFile(save, saveFile);
        }

        public static bool LoadChunk(Chunk chunk)
        {
            //* gets the save file
            string saveFile = $"{savePath}/{FileName(chunk.chunkWorldPos)}.dat";

            //* if the file does not exist return false
            if (!File.Exists(saveFile))
                return false;

            //* set all of the changed blocks in the chunk
            SaveChunk save = (SaveChunk)LoadFile(saveFile);

            foreach (var block in save.blocks)
            {
                chunk.blocks[block.Key.x, block.Key.y, block.Key.z] = block.Value;
            }

            return true;
        }

        public static string FileName(ChunkWorldPos pos)
        {
            return $"{pos.x}, {pos.y}, {pos.z}";
        }
        #endregion

        #region Save/Load Files
        private static void SaveFile(object obj, string file)
        {
            BinaryFormatter bf = new BinaryFormatter();
            FileStream fs = new FileStream(file, FileMode.OpenOrCreate);

            try
            {
                bf.Serialize(fs, obj);
            }
            catch(SerializationException e)
            {
                Debug.Log($"Serialization Exception: {e}");
                throw new SerializationException();
            }
            finally
            {
                fs.Close();
            }
        }

        private static object LoadFile(string file)
        {
            BinaryFormatter bf = new BinaryFormatter();
            FileStream fs = new FileStream(file, FileMode.Open);

            try
            {
                return bf.Deserialize(fs);
            }
            catch(SerializationException e)
            {
                Debug.Log($"Deserialization Exception {e}");
                throw new SerializationException();
            }
            finally
            {
                fs.Close();
            }
        }
        #endregion
    }
}
```

8.3 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/Extensions.cs File Reference

Classes

- class BeeGame.Core.Extensions

Namespaces

- namespace BeeGame.Core

8.4 Extensions.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Reflection;
using System.Text;

namespace BeeGame.Core
{
    public static class Extensions
    {
        public static T CloneObject<T>(this T obj)
        {
            //*gets the tyoe of the given object
            Type typeSource = obj.GetType();

            //*makes a new object of type T
            T objTarget = (T)Activator.CreateInstance(typeSource);

            //*gets the properties in T
            PropertyInfo[] propertyInfo = typeSource.GetProperties(BindingFlags.Public | BindingFlags.
NonPublic | BindingFlags.Instance);

            //*applies the properties in T to the new type T object
            foreach (var property in propertyInfo)
            {
                if (property.CanWrite)
                {
                    //*if the propertly is a value just set it
                    if (property.PropertyType.IsValueType || property.PropertyType.IsEnum || property.
PropertyType.Equals(typeof(string)))
                    {
                        property.SetValue(objTarget, property.GetValue(obj, null), null);
                    }
                    else
                    {
                        //*if the propertly is not a value type this function will need to be called
 recursivly as it could also have non value type veriables
                        object propertyValue = property.GetValue(obj, null);

                        if (propertyValue == null)
                        {
                            property.SetValue(obj, null, null);
                        }
                        else
                        {
                            property.SetValue(obj, propertyValue.CloneObject(), null);
                        }
                    }
                }

            }
            return objTarget;
        }
    }
}
```

8.5 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/test.cs File Reference

Classes

- class BeeGame.Test

Namespaces

- namespace BeeGame

8.6 test.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using UnityEngine;
using UnityEngine.UI;

namespace BeeGame
{
    public class Test : MonoBehaviour
    {
        private void Start()
        {
            Instantiate(BeeGame.Core.PrefabDictionary.
GetPrefab("Selector"));
        }
    }
}
```

8.7 C:/Users/Toothless/Documents/GitHub/BeeGame/Code/BeeGame/BeeGame/Core/Enums/Enums.cs File Reference

Namespaces

- namespace BeeGame.Core.Enums

Enumerations

- enum BeeGame.Core.Enums.Direction { BeeGame.Core.Enums.Direction.NORTH, BeeGame.Core.Enums.Direction.EAST, BeeGame.Core.↩ Enums.Direction.SOUTH, BeeGame.Core.Enums.Direction.WEST, BeeGame.Core.Enums.Direction.UP, BeeGame.Core.Enums.Direction.DOWN }

  Direction in the game

8.8 Enums.cs

```
namespace BeeGame.Core.Enums
{
    public enum Direction
    {
        NORTH, EAST, SOUTH, WEST, UP, DOWN
    };

}
```

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