

3D Map Visualization - documentation

1 BuilderScript.cs

1 BUILDERSCRIPT.CS

1.1 Blok

```
public Vector2[] bresenhamLine(Vector3 a, Vector3 b)
```

Takes two points returns (x,y) and returns rasterized line between them(array of points). Uses Bresenham line rasterization algorithm.

1.1.1 Riadok

```
bool steep = false;
```

iterate x, calculate y

1.1.2 Riadok

```
if (dy > dx)
```

iterate y, calculate x

1.2 Blok

```
private int[] swapInts(int a, int b)
```

Takes two integers and returns an array with them swapped in order.

1.3 Blok

```
public int[][][] drawContours(Vector2[][] contours, int height, int width)
```

Takes an array of rasterized contours, total width and height of contour map and marks them into a 3 dimensional array. First two dimensions represent y and x coordinates of points and the third serves for storing multiple overlapping contours. Returns this array.

1.3.1 Riadok

```
int[][][] ret = new int[height][][];
```

3 contours can overlap

1.4 Blok

```
y++)
```

Horizontal pass

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3D Map Visualization - documentation

1.5 Blok

1 BUILDERSCRIPT.CS

1.5 Blok

```
x++)
```

Horizontal pass

1.6 Blok

```
public int [][] scanline(int [][] contours)
```

Scans through drawn contour array horizontally and vertically, averaging the values, and marks relative height level for every field according to number of contours crossed on the way. 0 marks lowest level.

1.7 Blok

```
if (vstup.Length < y && vstup[0].Length < x)
```

pre pripad , ze je mensie pole nez vystup

1.8 Blok

```
if (a * interval + i < vstup.Length && b * interval + j < vstup[0].Length)
```

ak mi nestacia policka povodnych, ratam ich ako nuly

1.9 Blok

```
a++)
```

naplnim vsetky policka

1.10 Blok

```
public float [][] sampleQuantization(int [][] vstup, int x, int y)
```

inicializacia

1.10.1 Riadok

```
int maxsize = Math.Max(vstup[0].Length, vstup.Length);
```

ak mame velke pole a potrebujeme zmensit

1.10.2 Riadok

```
return vystup;
```

vratim vyplnenu tabulku

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2 MyTerrain.cs

2.1 Blok

```
public void load(List<Vector3[]> contours)
```

Loads cubic bezier representation of all contours in the map

2.2 Blok

```
public Vector3[][] getApproximatedContours(int detail)
```

Returns polygonal path representation of all contours in the map approximated with (detail-1) being number of approximated points on each curve. Uses Bernstein basis polynomial explicit definition as approximation strategy by setting t values

2.3 Blok

```
private int combinatorialNumber(int n, int k)
```

Returns value of combinatorial number n over k

2.4 Blok

```
private int factorial(int n)
```

Returns value of factorial n

3 Parser.cs

3.1 Blok

```
while (true)
```

need to find elements used as dictionary

3.2 Blok

```
if (idhash.ContainsValue(Convert.ToInt32(reader.GetAttribute("symbol"))))
```

Fill the contour field with a contour object

4 TerrainFill.cs

4.1 Blok

```
public void FillTerrain(float[][] input, TerrainData tData,
    Terrain myTerrain, int xBase, int yBase)
```

Fills terrain with values from scanline and quantization, but it must be divided by large number. Terrain needs float values between 0 and 1.

5 UIManager.cs

5.1 Blok

```
void Start ()
```

Initialization of type.

5.2 Blok

```
void OnLevelWasLoaded()
```

When main scene is loaded this will get path value.

5.3 Blok

```
public void LoadMapButton()
```

Function for load map button. Changes scene to filemanager scene.

5.4 Blok

```
public void LoadTrackButton()
```

Function for load track button. Changes scene to filemanager scene.

5.5 Blok

```
public void LoadMap(string path)
```

Integration function. When file was selected, this function is called and it runs all methods from project.

5.5.1 Riadok

```
parser.loadStringFromFile(path);
```

Calling parser with path.

3D Map Visualization - documentation

5.5.2 Riadok

```
int [][][] drawnContours = builder.drawContours(rasterized ,  
    height , width);
```

Draw rasterized contours to two-dimensional array.

5.5.3 Riadok

```
int [][] scanlined = builder.scanline(drawnContours);
```

Run scanline and check height between contours.

5.5.4 Riadok

```
float [][] res = builder.sampleQuantization(scanlined , 65, 65);
```

Quantize huge two-dimensional array into smaller 65x65 for terrain input

5.5.5 Riadok

```
terrain.FillTerrain(res , tData , myTerrain , xBase , yBase);
```

Fill terrain with input.

6 ViewController.cs

6.1 Blok

```
if (pos.magnitude > 0.0001f)
```

interpolate camera position, if needed

6.2 Blok

```
if ((pppos - gotoPosition).magnitude > 0.0001f)
```

interpolate camera position, if needed

6.3 Blok

```
if (Input.GetMouseButton(0))
```

if left mouse button, set new pivot position

3D Map Visualization - documentation

6.3.1 Riadok

```
gotoPosition += worldMouseVector * MoveSpeed * distanceFactor *  
    -1;
```

inverted axes

6.4 Blok

```
else if (Input.GetMouseButton(1))  
    if right mouse button, adjust target rotation of pivot
```

6.5 Blok

```
if (pos.magnitude >= ZoomCap || mouseWheel < 0f)  
    dont reverse the objects, cap max zoom
```

6.6 Blok

```
else if (Mathf.Abs(mouseWheel) > 0.0001f)  
    if mouse wheel is scrolling, adjust camera-pivot zoom
```

6.7 Blok

```
void FixedUpdate()
```

On every physics calculation, take input and readjust camera and its pivot

6.7.1 Riadok

```
Vector3 mouseVector = new Vector3(Input.GetAxis("Mouse X"),  
    Input.GetAxis("Mouse Y"));  
  
get screen mouse vector
```

6.7.2 Riadok

```
Vector3 worldMouseVector = pivotPoint.transform.  
    TransformDirection(mouseVector);  
  
convert into world coordinates
```

6.7.3 Riadok

```
float mouseWheel = Input.mouseScrollDelta.y;  
  
get mouse scroll input
```

3D Map Visualization - documentation

6.8 Blok

7 RUNTESTSSCRIPT.CS

6.7.4 Riadok

```
float rot = transform.rotation.eulerAngles.z;  
stabilize z axis rotation
```

6.8 Blok

```
public class ViewController : MonoBehaviour
```

MoveSpeed, RotateSpeed and ZoomSpeed can be floats in range (0..infinity>, ZoomFactor can be float in range (0..1)

7 RunTestsScript.cs

7.1 Blok

```
void Start()
```

Use this for initialization some tests may need to have readjusted protection levels for methods in order to run