

Space Invaders

Generated by Doxygen 1.8.6

Fri Apr 24 2015 08:31:08

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Chapter 3

Class Documentation

3.1 Alien Class Reference

```
#include <Alien.h>
```

Public Member Functions

- [Alien](#) ()
- float [GetXPos](#) ()
- float [GetYPos](#) ()
- float [GetAngle](#) ()
- [Color](#) [GetColor](#) ()
- int [GetLevel](#) ()
- int [GetLives](#) ()
- int [GetBullets](#) ()
- int [GetMissiles](#) ()
- int [GetType](#) ()
- void [SetXPos](#) (float)
- void [SetYPos](#) (float)
- void [SetAngle](#) (float)
- void [SetColor](#) ([Color](#))
- void [SetColorFloat](#) (int, int, int)
- void [SetColorFloat2](#) (float, float, float)
- void [SetLevel](#) (int)
- void [SetLives](#) (int)
- void [SetBullets](#) (int)
- void [SetMissiles](#) (int)
- void [SetType](#) (int)
- void [ReduceMissile](#) ()
- std::string [GetSummary](#) ()

Private Attributes

- float [XPos](#)
- float [YPos](#)
- float [Angle](#)
- [Color](#) [ColorOfAlien](#)
- int [Level](#)
- int [PresentLives](#)

- int [NumberBullets](#)
- int [NumberMissiles](#)
- int [AlienType](#)

3.1.1 Constructor & Destructor Documentation

3.1.1.1 `Alien::Alien ()`

3.1.2 Member Function Documentation

3.1.2.1 `float Alien::GetAngle ()`

3.1.2.2 `int Alien::GetBullets ()`

3.1.2.3 `Color Alien::GetColor ()`

3.1.2.4 `int Alien::GetLevel ()`

3.1.2.5 `int Alien::GetLives ()`

3.1.2.6 `int Alien::GetMissiles ()`

3.1.2.7 `std::string Alien::GetSummary ()`

3.1.2.8 `int Alien::GetType ()`

3.1.2.9 `float Alien::GetXPos ()`

3.1.2.10 `float Alien::GetYPos ()`

3.1.2.11 `void Alien::ReduceMissile ()`

3.1.2.12 `void Alien::SetAngle (float inclination_angle)`

3.1.2.13 `void Alien::SetBullets (int bullet_number)`

3.1.2.14 `void Alien::SetColor (Color alien_color)`

3.1.2.15 `void Alien::SetColorFloat (int red, int green, int blue)`

3.1.2.16 `void Alien::SetColorFloat2 (float r, float g, float b)`

3.1.2.17 `void Alien::SetLevel (int alien_level)`

3.1.2.18 `void Alien::SetLives (int alien_lives)`

3.1.2.19 `void Alien::SetMissiles (int missile_number)`

3.1.2.20 `void Alien::SetType (int type_alien)`

3.1.2.21 `void Alien::SetXPos (float xposition)`

3.1.2.22 `void Alien::SetYPos (float yposition)`

3.1.3 Member Data Documentation

- 3.1.3.1 `int Alien::AlienType` [private]
- 3.1.3.2 `float Alien::Angle` [private]
- 3.1.3.3 `Color Alien::ColorOfAlien` [private]
- 3.1.3.4 `int Alien::Level` [private]
- 3.1.3.5 `int Alien::NumberBullets` [private]
- 3.1.3.6 `int Alien::NumberMissiles` [private]
- 3.1.3.7 `int Alien::PresentLives` [private]
- 3.1.3.8 `float Alien::XPos` [private]
- 3.1.3.9 `float Alien::YPos` [private]

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

- [Alien.h](#)
- [Alien.cpp](#)

3.2 Board Class Reference

```
#include <Board.h>
```

Public Member Functions

- [Board](#) ()
- [Board](#) (double, double, double, double)
- void [SetPosXDimension](#) (double)
- void [SetPosYDimension](#) (double)
- void [SetNegXDimension](#) (double)
- void [SetNegYDimension](#) (double)
- void [SetVectorBullets](#) (std::vector< [Bullet](#) >)
- void [SetVectorShips](#) (std::vector< [Ship](#) >)
- void [SetVectorAliens](#) (std::vector< [Alien](#) >)
- void [SetNthBullet](#) (int, [Bullet](#))
- void [SetNthShip](#) (int, [Ship](#))
- void [SetNthAlien](#) (int, [Alien](#))
- std::vector< [Bullet](#) > [GetVectorBullets](#) ()
- std::vector< [Ship](#) > [GetVectorShips](#) ()
- std::vector< [Alien](#) > [GetVectorAliens](#) ()
- double [GetPosXDimension](#) ()
- double [GetPosYDimension](#) ()
- double [GetNegXDimension](#) ()
- double [GetNegYDimension](#) ()
- int [GetNumberShips](#) ()
- int [GetNumberAliens](#) ()
- int [GetNumberBullets](#) ()
- [Bullet](#) [GetNthBullet](#) (int)
- [Alien](#) [GetNthAlien](#) (int)

- [Ship GetNthShip](#) (int)
- void [RemoveNthAlien](#) (int)
- void [RemoveNthBullet](#) (int)
- void [RemoveNthShip](#) (int)
- double [MaxDistance](#) ()
- int [CheckBulletHitAlien](#) (int)
- int [CheckBulletHitShip](#) (int)
- std::vector< int > [CheckAlienHitShip](#) (int)
- std::vector< [Points](#) > [UpdateAllBullets](#) ()
- void [UpdateAliens](#) ()
- void [UpdatePlayerAI](#) ()
- void [InsertBullet](#) ([Bullet](#))
- void [InsertAlien](#) ([Alien](#))
- void [InsertShip](#) ([Ship](#))
- std::string [GetSummary](#) ()
- void [MoveNthShip](#) (int, int)
- void [AddRandomShip](#) ()
- void [AddRandomAlien](#) ()
- std::string [GeneratePlayerPositionInstructions](#) (int)
- std::string [GeneratePlayerBulletInstructions](#) (std::vector< [Bullet](#) >)
- std::string [GeneratePlayerInstructions](#) (int, std::vector< [Bullet](#) >)
- std::vector< std::string > [SplitString](#) (std::string, char)
- void [ApplyInsToShip](#) (std::vector< std::string >, [Ship](#))
- void [ApplyInsToBullets](#) (std::string)
- void [ApplyShipInstructions](#) (std::string, int)
- std::string [GenerateAllBulletInstructions](#) ()
- void [ApplySingleBulletInstructions](#) ([Bullet](#), std::string)
- void [ApplyAllBulletInstructions](#) (std::string)
- std::string [GenerateOnlyPlayerInstructions](#) (int, std::vector< [Bullet](#) >)
- std::string [GenerateAllInstructions](#) (int, std::vector< [Points](#) >)
- std::vector< [Points](#) > [ApplyInstructions](#) (std::string, int)
- std::string [GeneratingCount](#) ()
- void [ApplyInstruction6](#) (std::string)
- std::string [GenerateAliensInformation](#) ()
- void [ApplySingleAlienInstructions](#) ([Alien](#), std::string)
- void [ApplyAllAlienInstructions](#) (std::string information)
- void [ApplyPlayerBulletInstructions](#) (std::string)
- void [UpdateBulletsWithoutKilling](#) ()
- std::string [GetNthPlayerScore](#) (int)
- std::string [GetNthPlayerName](#) (int)
- std::vector< [Points](#) > [GetVectorPoints](#) (std::string)
- std::string [GetStringPoints](#) (std::vector< [Points](#) >)
- std::string [GenerateShipInsForAI](#) ()
- void [ApplyInstructionsToShipAI](#) (std::string)
- bool [CheckGameOver](#) ()
- std::vector< std::string > [GetRanking](#) ()
- [Board](#) ()
- [Board](#) (double, double, double, double)
- void [SetPosXDimension](#) (double)
- void [SetPosYDimension](#) (double)
- void [SetNegXDimension](#) (double)
- void [SetNegYDimension](#) (double)
- void [SetVectorBullets](#) (std::vector< [Bullet](#) >)
- void [SetVectorShips](#) (std::vector< [Ship](#) >)
- void [SetVectorAliens](#) (std::vector< [Alien](#) >)

- void [SetNthBullet](#) (int, [Bullet](#))
- void [SetNthShip](#) (int, [Ship](#))
- void [SetNthAlien](#) (int, [Alien](#))
- std::vector< [Bullet](#) > [GetVectorBullets](#) ()
- std::vector< [Ship](#) > [GetVectorShips](#) ()
- std::vector< [Alien](#) > [GetVectorAliens](#) ()
- double [GetPosXDimension](#) ()
- double [GetPosYDimension](#) ()
- double [GetNegXDimension](#) ()
- double [GetNegYDimension](#) ()
- int [GetNumberShips](#) ()
- int [GetNumberAliens](#) ()
- int [GetNumberBullets](#) ()
- [Bullet](#) [GetNthBullet](#) (int)
- [Alien](#) [GetNthAlien](#) (int)
- [Ship](#) [GetNthShip](#) (int)
- void [RemoveNthAlien](#) (int)
- void [RemoveNthBullet](#) (int)
- void [RemoveNthShip](#) (int)
- double [MaxDistance](#) ()
- int [CheckBulletHitAlien](#) (int)
- int [CheckBulletHitShip](#) (int)
- std::vector< int > [CheckAlienHitShip](#) (int)
- std::vector< [Points](#) > [UpdateAllBullets](#) ()
- void [UpdateAliens](#) ()
- void [UpdatePlayerAI](#) ()
- void [InsertBullet](#) ([Bullet](#))
- void [InsertAlien](#) ([Alien](#))
- void [InsertShip](#) ([Ship](#))
- std::string [GetSummary](#) ()
- void [MoveNthShip](#) (int, int)
- void [AddRandomShip](#) ()
- void [AddRandomAlien](#) ()
- std::string [GeneratePlayerPositionInstructions](#) (int)
- std::string [GeneratePlayerBulletInstructions](#) (std::vector< [Bullet](#) >)
- std::string [GeneratePlayerInstructions](#) (int, std::vector< [Bullet](#) >)
- std::vector< std::string > [SplitString](#) (std::string, char)
- void [ApplyInsToShip](#) (std::vector< std::string >, [Ship](#))
- void [ApplyInsToBullets](#) (std::string)
- void [ApplyShipInstructions](#) (std::string, int)
- std::string [GenerateAllBulletInstructions](#) ()
- void [ApplySingleBulletInstructions](#) ([Bullet](#), std::string)
- void [ApplyAllBulletInstructions](#) (std::string)
- std::string [GenerateOnlyPlayerInstructions](#) (int, std::vector< [Bullet](#) >)
- std::string [GenerateAllInstructions](#) (int, std::vector< [Points](#) >)
- std::vector< [Points](#) > [ApplyInstructions](#) (std::string, int)
- std::string [GeneratingCount](#) ()
- void [ApplyInstruction6](#) (std::string)
- std::string [GenerateAliensInformation](#) ()
- void [ApplySingleAlienInstructions](#) ([Alien](#), std::string)
- void [ApplyAllAlienInstructions](#) (std::string information)
- void [ApplyPlayerBulletInstructions](#) (std::string)
- void [UpdateBulletsWithoutKilling](#) ()
- std::string [GetNthPlayerScore](#) (int)
- std::vector< [Points](#) > [GetVectorPoints](#) (std::string)
- std::string [GetStringPoints](#) (std::vector< [Points](#) >)
- bool [CheckGameOver](#) ()
- std::vector< std::string > [GetRanking](#) ()

Private Attributes

- `std::vector< Ship > VectorShips`
- `std::vector< Bullet > VectorBullets`
- `std::vector< Alien > VectorAliens`
- `double DimensionPosX`
- `double DimensionPosY`
- `double DimensionNegX`
- `double DimensionNegY`

3.2.1 Constructor & Destructor Documentation

3.2.1.1 `Board::Board ()`

3.2.1.2 `Board::Board (double posx, double negx, double posy, double negy)`

3.2.1.3 `Board::Board ()`

3.2.1.4 `Board::Board (double , double , double , double)`

3.2.2 Member Function Documentation

3.2.2.1 `void Board::AddRandomAlien ()`

3.2.2.2 `void Board::AddRandomAlien ()`

3.2.2.3 `void Board::AddRandomShip ()`

3.2.2.4 `void Board::AddRandomShip ()`

3.2.2.5 `void Board::ApplyAllAlienInstructions (std::string information)`

3.2.2.6 `void Board::ApplyAllAlienInstructions (std::string information)`

3.2.2.7 `void Board::ApplyAllBulletInstructions (std::string)`

3.2.2.8 `void Board::ApplyAllBulletInstructions (std::string information)`

3.2.2.9 `void Board::ApplyInsToBullets (std::string bulletinfostring)`

3.2.2.10 `void Board::ApplyInsToBullets (std::string)`

3.2.2.11 `void Board::ApplyInsToShip (std::vector< std::string > s, Ship shiptochange)`

3.2.2.12 `void Board::ApplyInsToShip (std::vector< std::string > , Ship)`

3.2.2.13 `void Board::ApplyInstruction6 (std::string information)`

3.2.2.14 `void Board::ApplyInstruction6 (std::string)`

3.2.2.15 `std::vector< Points > Board::ApplyInstructions (std::string information, int shipid)`

3.2.2.16 `std::vector<Points> Board::ApplyInstructions (std::string , int)`

3.2.2.17 `void Board::ApplyInstructionsToShipAI (std::string information)`

- 3.2.2.18 void Board::ApplyPlayerBulletInstructions (std::string *information*)
- 3.2.2.19 void Board::ApplyPlayerBulletInstructions (std::string)
- 3.2.2.20 void Board::ApplyShipInstructions (std::string *information*, int *t*)
- 3.2.2.21 void Board::ApplyShipInstructions (std::string , int)
- 3.2.2.22 void Board::ApplySingleAlienInstructions (Alien *alien_applied*, std::string *information*)
- 3.2.2.23 void Board::ApplySingleAlienInstructions (Alien , std::string)
- 3.2.2.24 void Board::ApplySingleBulletInstructions (Bullet *bullet_applied*, std::string *information*)
- 3.2.2.25 void Board::ApplySingleBulletInstructions (Bullet , std::string)
- 3.2.2.26 std::vector< int > Board::CheckAlienHitShip (int *shipid*)
- 3.2.2.27 std::vector<int> Board::CheckAlienHitShip (int)
- 3.2.2.28 int Board::CheckBulletHitAlien (int *bullet_id*)
- 3.2.2.29 int Board::CheckBulletHitAlien (int)
- 3.2.2.30 int Board::CheckBulletHitShip (int)
- 3.2.2.31 int Board::CheckBulletHitShip (int *id*)
- 3.2.2.32 bool Board::CheckGameOver ()
- 3.2.2.33 bool Board::CheckGameOver ()
- 3.2.2.34 std::string Board::GenerateAliensInformation ()
- 3.2.2.35 std::string Board::GenerateAliensInformation ()
- 3.2.2.36 std::string Board::GenerateAllBulletInstructions ()
- 3.2.2.37 std::string Board::GenerateAllBulletInstructions ()
- 3.2.2.38 std::string Board::GenerateAllInstructions (int *player_id*, std::vector< Points > *points*)
- 3.2.2.39 std::string Board::GenerateAllInstructions (int , std::vector< Points >)
- 3.2.2.40 std::string Board::GenerateOnlyPlayerInstructions (int *player_id*, std::vector< Bullet > *vector_bullet*)
- 3.2.2.41 std::string Board::GenerateOnlyPlayerInstructions (int , std::vector< Bullet >)
- 3.2.2.42 std::string Board::GeneratePlayerBulletInstructions (std::vector< Bullet > *vector_bullet*)
- 3.2.2.43 std::string Board::GeneratePlayerBulletInstructions (std::vector< Bullet >)
- 3.2.2.44 std::string Board::GeneratePlayerInstructions (int *player_id*, std::vector< Bullet > *vector_bullet*)
- 3.2.2.45 std::string Board::GeneratePlayerInstructions (int , std::vector< Bullet >)

3.2.2.46 `std::string Board::GeneratePlayerPositionInstructions (int player_id)`

3.2.2.47 `std::string Board::GeneratePlayerPositionInstructions (int)`

3.2.2.48 `std::string Board::GenerateShipInsForAI ()`

3.2.2.49 `std::string Board::GeneratingCount ()`

3.2.2.50 `std::string Board::GeneratingCount ()`

3.2.2.51 `double Board::GetNegXDimension ()`

3.2.2.52 `double Board::GetNegXDimension ()`

3.2.2.53 `double Board::GetNegYDimension ()`

3.2.2.54 `double Board::GetNegYDimension ()`

3.2.2.55 `Alien Board::GetNthAlien (int id)`

3.2.2.56 `Alien Board::GetNthAlien (int)`

3.2.2.57 `Bullet Board::GetNthBullet (int)`

3.2.2.58 `Bullet Board::GetNthBullet (int id)`

3.2.2.59 `std::string Board::GetNthPlayerName (int shipid)`

3.2.2.60 `std::string Board::GetNthPlayerScore (int)`

3.2.2.61 `std::string Board::GetNthPlayerScore (int shipid)`

3.2.2.62 `Ship Board::GetNthShip (int)`

3.2.2.63 `Ship Board::GetNthShip (int id)`

3.2.2.64 `int Board::GetNumberAliens ()`

3.2.2.65 `int Board::GetNumberAliens ()`

3.2.2.66 `int Board::GetNumberBullets ()`

3.2.2.67 `int Board::GetNumberBullets ()`

3.2.2.68 `int Board::GetNumberShips ()`

3.2.2.69 `int Board::GetNumberShips ()`

3.2.2.70 `double Board::GetPosXDimension ()`

3.2.2.71 `double Board::GetPosXDimension ()`

3.2.2.72 `double Board::GetPosYDimension ()`

3.2.2.73 `double Board::GetPosYDimension ()`

- 3.2.2.74 `std::vector<std::string> Board::GetRanking ()`
- 3.2.2.75 `std::vector< std::string > Board::GetRanking ()`
- 3.2.2.76 `std::string Board::GetStringPoints (std::vector< Points >)`
- 3.2.2.77 `std::string Board::GetStringPoints (std::vector< Points > points)`
- 3.2.2.78 `std::string Board::GetSummary ()`
- 3.2.2.79 `std::string Board::GetSummary ()`
- 3.2.2.80 `std::vector<Alien> Board::GetVectorAliens ()`
- 3.2.2.81 `std::vector< Alien > Board::GetVectorAliens ()`
- 3.2.2.82 `std::vector<Bullet> Board::GetVectorBullets ()`
- 3.2.2.83 `std::vector< Bullet > Board::GetVectorBullets ()`
- 3.2.2.84 `std::vector<Points> Board::GetVectorPoints (std::string)`
- 3.2.2.85 `std::vector< Points > Board::GetVectorPoints (std::string information)`
- 3.2.2.86 `std::vector<Ship> Board::GetVectorShips ()`
- 3.2.2.87 `std::vector< Ship > Board::GetVectorShips ()`
- 3.2.2.88 `void Board::InsertAlien (Alien new_alien)`
- 3.2.2.89 `void Board::InsertAlien (Alien)`
- 3.2.2.90 `void Board::InsertBullet (Bullet new_bullet)`
- 3.2.2.91 `void Board::InsertBullet (Bullet)`
- 3.2.2.92 `void Board::InsertShip (Ship new_ship)`
- 3.2.2.93 `void Board::InsertShip (Ship)`
- 3.2.2.94 `double Board::MaxDistance ()`
- 3.2.2.95 `double Board::MaxDistance ()`
- 3.2.2.96 `void Board::MoveNthShip (int ship_id, int mov_type)`
- 3.2.2.97 `void Board::MoveNthShip (int , int)`
- 3.2.2.98 `void Board::RemoveNthAlien (int id)`
- 3.2.2.99 `void Board::RemoveNthAlien (int)`
- 3.2.2.100 `void Board::RemoveNthBullet (int id)`
- 3.2.2.101 `void Board::RemoveNthBullet (int)`

- 3.2.2.102 void Board::RemoveNthShip (int *id*)
- 3.2.2.103 void Board::RemoveNthShip (int)
- 3.2.2.104 void Board::SetNegXDimension (double *negx*)
- 3.2.2.105 void Board::SetNegXDimension (double)
- 3.2.2.106 void Board::SetNegYDimension (double *negy*)
- 3.2.2.107 void Board::SetNegYDimension (double)
- 3.2.2.108 void Board::SetNthAlien (int *id*, Alien *set_alien*)
- 3.2.2.109 void Board::SetNthAlien (int , Alien)
- 3.2.2.110 void Board::SetNthBullet (int *id*, Bullet *set_bullet*)
- 3.2.2.111 void Board::SetNthBullet (int , Bullet)
- 3.2.2.112 void Board::SetNthShip (int *id*, Ship *set_ship*)
- 3.2.2.113 void Board::SetNthShip (int , Ship)
- 3.2.2.114 void Board::SetPosXDimension (double)
- 3.2.2.115 void Board::SetPosXDimension (double *posx*)
- 3.2.2.116 void Board::SetPosYDimension (double *posy*)
- 3.2.2.117 void Board::SetPosYDimension (double)
- 3.2.2.118 void Board::SetVectorAliens (std::vector< Alien >)
- 3.2.2.119 void Board::SetVectorAliens (std::vector< Alien > *alien_vector*)
- 3.2.2.120 void Board::SetVectorBullets (std::vector< Bullet >)
- 3.2.2.121 void Board::SetVectorBullets (std::vector< Bullet > *bullet_vector*)
- 3.2.2.122 void Board::SetVectorShips (std::vector< Ship >)
- 3.2.2.123 void Board::SetVectorShips (std::vector< Ship > *ship_vector*)
- 3.2.2.124 std::vector< std::string > Board::SplitString (std::string *s*, char *chartosplit*)
- 3.2.2.125 std::vector<std::string> Board::SplitString (std::string , char)
- 3.2.2.126 void Board::UpdateAliens ()
- 3.2.2.127 void Board::UpdateAliens ()
- 3.2.2.128 std::vector<Points> Board::UpdateAllBullets ()
- 3.2.2.129 std::vector< Points > Board::UpdateAllBullets ()

3.2.2.130 void Board::UpdateBulletsWithoutKilling ()

3.2.2.131 void Board::UpdateBulletsWithoutKilling ()

3.2.2.132 void Board::UpdatePlayerAI ()

3.2.2.133 void Board::UpdatePlayerAI ()

3.2.3 Member Data Documentation

3.2.3.1 double Board::DimensionNegX [private]

3.2.3.2 double Board::DimensionNegY [private]

3.2.3.3 double Board::DimensionPosX [private]

3.2.3.4 double Board::DimensionPosY [private]

3.2.3.5 std::vector< Alien > Board::VectorAliens [private]

3.2.3.6 std::vector< Bullet > Board::VectorBullets [private]

3.2.3.7 std::vector< Ship > Board::VectorShips [private]

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

- [Board.h](#)
- [CompetitiveBoard.h](#)
- [backupcoop.cpp](#)
- [Board.cpp](#)
- [CompetitiveBoard.cpp](#)

3.3 Bullet Class Reference

```
#include <Bullet.h>
```

Public Member Functions

- [Bullet](#) ()
- float [GetXPos](#) ()
- float [GetYPos](#) ()
- float [GetVelX](#) ()
- float [GetVelY](#) ()
- float [GetSpeed](#) ()
- [Color](#) [GetColorOfBullet](#) ()
- int [GetShipId](#) ()
- bool [GetTypeAI](#) ()
- bool [GetTypePlayer](#) ()
- int [GetTimeCreated](#) ()
- void [SetXPos](#) (float)
- void [SetYPos](#) (float)
- void [SetVelX](#) (float)
- void [SetVelY](#) (float)

- void [SetColorOfBullet](#) ([Color](#))
- void [SetColorOfBulletfloat](#) (int, int, int)
- void [SetColorFloat](#) (float, float, float)
- void [SetShipID](#) (int)
- void [SetTypeAI](#) (bool)
- void [SetTypePlayer](#) (bool)
- void [SetTimeCreated](#) (int)
- void [ResetBulletState](#) ()
- std::string [GetSummary](#) ()
- float [GetAngle](#) ()

Private Attributes

- float [XPos](#)
- float [YPos](#)
- float [VelX](#)
- float [VelY](#)
- [Color](#) [ColorOfBullet](#)
- int [ShipId](#)
- bool [TypeAI](#)
- bool [TypePlayer](#)
- int [TimeCreated](#)

3.3.1 Constructor & Destructor Documentation

3.3.1.1 [Bullet::Bullet](#) ()

3.3.2 Member Function Documentation

3.3.2.1 [float Bullet::GetAngle](#) ()

3.3.2.2 [Color Bullet::GetColorOfBullet](#) ()

3.3.2.3 [int Bullet::GetShipId](#) ()

3.3.2.4 [float Bullet::GetSpeed](#) ()

3.3.2.5 [std::string Bullet::GetSummary](#) ()

3.3.2.6 [int Bullet::GetTimeCreated](#) ()

3.3.2.7 [bool Bullet::GetTypeAI](#) ()

3.3.2.8 [bool Bullet::GetTypePlayer](#) ()

3.3.2.9 [float Bullet::GetVelX](#) ()

3.3.2.10 [float Bullet::GetVelY](#) ()

3.3.2.11 [float Bullet::GetXPos](#) ()

3.3.2.12 [float Bullet::GetYPos](#) ()

3.3.2.13 [void Bullet::ResetBulletState](#) ()

- 3.3.2.14 void Bullet::SetColorFloat (float *r*, float *g*, float *b*)
- 3.3.2.15 void Bullet::SetColorOfBullet (Color *bulletcolor*)
- 3.3.2.16 void Bullet::SetColorOfBulletfloat (int *red*, int *green*, int *blue*)
- 3.3.2.17 void Bullet::SetShipID (int *ship_id*)
- 3.3.2.18 void Bullet::SetTimeCreated (int *t*)
- 3.3.2.19 void Bullet::SetTypeAI (bool *AI*)
- 3.3.2.20 void Bullet::SetTypePlayer (bool *type_player*)
- 3.3.2.21 void Bullet::SetVelX (float *xvelocity*)
- 3.3.2.22 void Bullet::SetVelY (float *yvelocity*)
- 3.3.2.23 void Bullet::SetXPos (float *xposition*)
- 3.3.2.24 void Bullet::SetYPos (float *yposition*)

3.3.3 Member Data Documentation

- 3.3.3.1 Color Bullet::ColorOfBullet [private]
- 3.3.3.2 int Bullet::ShipId [private]
- 3.3.3.3 int Bullet::TimeCreated [private]
- 3.3.3.4 bool Bullet::TypeAI [private]
- 3.3.3.5 bool Bullet::TypePlayer [private]
- 3.3.3.6 float Bullet::VelX [private]
- 3.3.3.7 float Bullet::VelY [private]
- 3.3.3.8 float Bullet::XPos [private]
- 3.3.3.9 float Bullet::YPos [private]

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

- [Bullet.h](#)
- [Bullet.cpp](#)

3.4 Color Class Reference

```
#include <Color.h>
```

Public Member Functions

- [Color](#) ()

- [Color](#) (int, int, int)
- float [GetR](#) ()
- float [GetG](#) ()
- float [GetB](#) ()
- void [SetR](#) (int)
- void [SetG](#) (int)
- void [SetB](#) (int)
- void [SetRGBFloat](#) (float, float, float)
- void [SetRGB](#) (int, int, int)

Private Attributes

- float [R](#)
- float [G](#)
- float [B](#)

3.4.1 Constructor & Destructor Documentation

3.4.1.1 [Color::Color](#) ()

Constructor for [Color](#)

Default constructor. Red color

Parameters

<i>r</i>	red component
<i>g</i>	green component
<i>b</i>	blue component

Returns

only red color

3.4.1.2 [Color::Color](#) (int *r*, int *g*, int *b*)

3.4.2 Member Function Documentation

3.4.2.1 float [Color::GetB](#) ()

3.4.2.2 float [Color::GetG](#) ()

3.4.2.3 float [Color::GetR](#) ()

3.4.2.4 void [Color::SetB](#) (int *b*)

3.4.2.5 void [Color::SetG](#) (int *g*)

3.4.2.6 void [Color::SetR](#) (int *r*)

3.4.2.7 void [Color::SetRGB](#) (int *r*, int *g*, int *b*)

3.4.2.8 void [Color::SetRGBFloat](#) (float *r*, float *g*, float *b*)

3.4.3 Member Data Documentation

3.4.3.1 float Color::B [private]

3.4.3.2 float Color::G [private]

3.4.3.3 float Color::R [private]

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

- [Color.h](#)
- [Color.cpp](#)

3.5 debrisData Struct Reference

```
#include <Combined.h>
```

Public Attributes

- float [position](#) [3]
- float [speed](#) [3]
- float [orientation](#) [3]
- float [orientationSpeed](#) [3]
- float [color](#) [3]
- float [scale](#) [3]

3.5.1 Member Data Documentation

3.5.1.1 float debrisData::color

3.5.1.2 float debrisData::orientation

3.5.1.3 float debrisData::orientationSpeed

3.5.1.4 float debrisData::position

3.5.1.5 float debrisData::scale

3.5.1.6 float debrisData::speed

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

- [Combined.h](#)
- [CompCombined.h](#)

3.6 Expl Struct Reference

```
#include <Combined.h>
```

Public Attributes

- [particleData](#) [particles](#) [NUM_PARTICLES]
- [debrisData](#) [debris](#) [NUM_DEBRIS]

- int [fuel](#) = 0
- float [angle](#) = 0.0

3.6.1 Member Data Documentation

3.6.1.1 float [Expl::angle](#) = 0.0

3.6.1.2 [debrisData](#) [Expl::debris](#)

3.6.1.3 int [Expl::fuel](#) = 0

3.6.1.4 [particleData](#) [Expl::particles](#)

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

- [Combined.h](#)
- [CompCombined.h](#)

3.7 Faces Struct Reference

```
#include <Combined.h>
```

Public Attributes

- [Points](#) [p1](#)
- [Points](#) [p2](#)
- [Points](#) [p3](#)

3.7.1 Member Data Documentation

3.7.1.1 [Points](#) [Faces::p1](#)

3.7.1.2 [Points](#) [Faces::p2](#)

3.7.1.3 [Points](#) [Faces::p3](#)

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

- [Combined.h](#)
- [CompCombined.h](#)

3.8 FirePoint Struct Reference

```
#include <Combined.h>
```

Public Attributes

- float [position](#) [3]
- float [color](#) [4]
- int [life](#)
- float [radius](#)

3.8.1 Member Data Documentation

3.8.1.1 float FirePoint::color

3.8.1.2 int FirePoint::life

3.8.1.3 float FirePoint::position

3.8.1.4 float FirePoint::radius

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

- [Combined.h](#)
- [CompCombined.h](#)

3.9 GamePlay Struct Reference

```
#include <Combined.h>
```

Public Attributes

- [Board](#) PlayerBoard
- int [PlayerId](#)
- int [LastBulletTime](#)
- int [LastMissileTime](#)
- bool [IsActive](#)

3.9.1 Member Data Documentation

3.9.1.1 bool Gameplay::IsActive

3.9.1.2 int Gameplay::LastBulletTime

3.9.1.3 int Gameplay::LastMissileTime

3.9.1.4 [Board](#) Gameplay::PlayerBoard

3.9.1.5 int Gameplay::PlayerId

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

- [Combined.h](#)
- [CompCombined.h](#)

3.10 Graph Struct Reference

```
#include <Combined.h>
```

Public Attributes

- int [x1](#)
- char ** [s1](#)

3.10.1 Member Data Documentation

3.10.1.1 `char ** Graph::s1`

3.10.1.2 `int Graph::x1`

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

- [Combined.h](#)
- [CompCombined.h](#)

3.11 IDScore Struct Reference

Public Member Functions

- [IDScore\(\)](#)
- [IDScore\(\)](#)
- [IDScore\(\)](#)

Public Attributes

- `int` [ID](#)
- `int` [Score](#)
- `std::string` [name](#)
- `string` [name](#)

3.11.1 Constructor & Destructor Documentation

3.11.1.1 `IDScore::IDScore()` [[inline](#)]

3.11.1.2 `IDScore::IDScore()` [[inline](#)]

3.11.1.3 `IDScore::IDScore()` [[inline](#)]

3.11.2 Member Data Documentation

3.11.2.1 `int IDScore::ID`

3.11.2.2 `string IDScore::name`

3.11.2.3 `std::string IDScore::name`

3.11.2.4 `int IDScore::Score`

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

- [CompHighscore.cpp](#)
- [Highscore.cpp](#)
- [testmera.cpp](#)

3.12 Image Class Reference

```
#include <Image.h>
```

Public Member Functions

- [Image](#) (char *ps, int w, int h)
- [~Image](#) ()

Public Attributes

- char * [pixels](#)
- int [width](#)
- int [height](#)

3.12.1 Constructor & Destructor Documentation

3.12.1.1 [Image::Image](#) (char * *ps*, int *w*, int *h*)

3.12.1.2 [Image::~~Image](#) ()

3.12.2 Member Data Documentation

3.12.2.1 int [Image::height](#)

3.12.2.2 char* [Image::pixels](#)

3.12.2.3 int [Image::width](#)

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

- [Image.h](#)
- [Image.cpp](#)

3.13 IPMessage Struct Reference

Public Attributes

- long long [ip](#)
- char * [message](#)
- int [sockid](#)

3.13.1 Member Data Documentation

3.13.1.1 long long [IPMessage::ip](#)

3.13.1.2 char* [IPMessage::message](#)

3.13.1.3 int [IPMessage::sockid](#)

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

- [udp.cpp](#)

3.14 particleData Struct Reference

```
#include <Combined.h>
```

Public Attributes

- float [position](#) [3]
- float [speed](#) [3]
- float [color](#) [3]

3.14.1 Member Data Documentation

3.14.1.1 float [particleData::color](#)

3.14.1.2 float [particleData::position](#)

3.14.1.3 float [particleData::speed](#)

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

- [Combined.h](#)
- [CompCombined.h](#)

3.15 Points Struct Reference

```
#include <Board.h>
```

Public Attributes

- float [x](#)
- float [y](#)
- float [z](#)

3.15.1 Member Data Documentation

3.15.1.1 float [Points::x](#)

3.15.1.2 float [Points::y](#)

3.15.1.3 float [Points::z](#)

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

- [Board.h](#)
- [CompetitiveBoard.h](#)

3.16 Ship Class Reference

```
#include <Ship.h>
```

Public Member Functions

- [Ship](#) ()
- [Ship](#) (int id)
- float [GetXPos](#) ()
- float [GetYPos](#) ()
- float [GetAngle](#) ()
- std::string [GetName](#) ()
- [Color](#) [GetColor](#) ()
- int [GetLives](#) ()
- int [GetScore](#) ()
- int [GetMultiplier](#) ()
- int [GetKills](#) ()
- int [GetId](#) ()
- int [GetNumberBullets](#) ()
- int [GetNumberMissiles](#) ()
- int [GetAIControlLevel](#) ()
- void [SetXPos](#) (float)
- void [SetYPos](#) (float)
- void [SetAngle](#) (float)
- void [SetName](#) (std::string)
- void [SetColorOfShip](#) ([Color](#))
- void [SetColorFloat](#) (int, int, int)
- void [SetColorFloatInp](#) (float, float, float)
- void [SetLives](#) (int)
- void [SetScore](#) (int)
- void [SetMultiplier](#) (int)
- void [SetKills](#) (int)
- void [SetId](#) (int)
- void [SetNumberBullets](#) (int)
- void [SetNumberMissiles](#) (int)
- void [SetAIControlLevel](#) (int)
- bool [IfAIControl](#) ()
- bool [IfHumanControl](#) ()
- void [AddLife](#) ()
- void [ReduceLife](#) ()
- void [IncrementScore](#) ()
- void [IncrementMultiplier](#) ()
- void [ResetMultiplier](#) ()
- void [AddKills](#) ()
- void [ResetKills](#) ()
- void [AddNumberBullets](#) ()
- void [ResetNumberBullets](#) ()
- void [AddMissile](#) ()
- void [ReduceMissile](#) ()
- std::string [GetSummary](#) ()

Private Attributes

- float [XPos](#)
- float [YPos](#)
- float [Angle](#)
- std::string [Name](#)
- [Color](#) [ColorOfShip](#)
- int [Lives](#)
- int [Score](#)
- int [Multiplier](#)
- int [Kills](#)
- int [Id](#)
- int [NumberBullets](#)
- int [NumberMissiles](#)
- int [AILevel](#)

3.16.1 Constructor & Destructor Documentation

3.16.1.1 `Ship::Ship ()`

3.16.1.2 `Ship::Ship (int id)`

3.16.2 Member Function Documentation

3.16.2.1 `void Ship::AddKills ()`

3.16.2.2 `void Ship::AddLife ()`

3.16.2.3 `void Ship::AddMissile ()`

3.16.2.4 `void Ship::AddNumberBullets ()`

3.16.2.5 `int Ship::GetAIControlLevel ()`

3.16.2.6 `float Ship::GetAngle ()`

3.16.2.7 `Color Ship::GetColor ()`

3.16.2.8 `int Ship::GetId ()`

3.16.2.9 `int Ship::GetKills ()`

3.16.2.10 `int Ship::GetLives ()`

3.16.2.11 `int Ship::GetMultiplier ()`

3.16.2.12 `std::string Ship::GetName ()`

3.16.2.13 `int Ship::GetNumberBullets ()`

3.16.2.14 `int Ship::GetNumberMissiles ()`

3.16.2.15 `int Ship::GetScore ()`

3.16.2.16 `std::string Ship::GetSummary ()`

- 3.16.2.17 float Ship::GetXPos ()
- 3.16.2.18 float Ship::GetYPos ()
- 3.16.2.19 bool Ship::IfAIControl ()
- 3.16.2.20 bool Ship::IfHumanControl ()
- 3.16.2.21 void Ship::IncrementMultiplier ()
- 3.16.2.22 void Ship::IncrementScore ()
- 3.16.2.23 void Ship::ReduceLife ()
- 3.16.2.24 void Ship::ReduceMissile ()
- 3.16.2.25 void Ship::ResetKills ()
- 3.16.2.26 void Ship::ResetMultiplier ()
- 3.16.2.27 void Ship::ResetNumberBullets ()
- 3.16.2.28 void Ship::SetAIControlLevel (int *level*)
- 3.16.2.29 void Ship::SetAngle (float *angle*)
- 3.16.2.30 void Ship::SetColorFloat (int *red*, int *green*, int *blue*)
- 3.16.2.31 void Ship::SetColorFloatInp (float *r*, float *g*, float *b*)
- 3.16.2.32 void Ship::SetColorOfShip (Color *color_ship*)
- 3.16.2.33 void Ship::SetId (int *id*)
- 3.16.2.34 void Ship::SetKills (int *kills*)
- 3.16.2.35 void Ship::SetLives (int *lives*)
- 3.16.2.36 void Ship::SetMultiplier (int *mult*)
- 3.16.2.37 void Ship::SetName (std::string *name*)
- 3.16.2.38 void Ship::SetNumberBullets (int *no_of_bullets*)
- 3.16.2.39 void Ship::SetNumberMissiles (int *no_of_missiles*)
- 3.16.2.40 void Ship::SetScore (int *score*)
- 3.16.2.41 void Ship::SetXPos (float *posx*)
- 3.16.2.42 void Ship::SetYPos (float *posy*)

3.16.3 Member Data Documentation

- 3.16.3.1 int Ship::AllLevel [private]

3.16.3.2 float Ship::Angle [private]
3.16.3.3 Color Ship::ColorOfShip [private]
3.16.3.4 int Ship::Id [private]
3.16.3.5 int Ship::Kills [private]
3.16.3.6 int Ship::Lives [private]
3.16.3.7 int Ship::Multiplier [private]
3.16.3.8 std::string Ship::Name [private]
3.16.3.9 int Ship::NumberBullets [private]
3.16.3.10 int Ship::NumberMissiles [private]
3.16.3.11 int Ship::Score [private]
3.16.3.12 float Ship::XPos [private]
3.16.3.13 float Ship::YPos [private]

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

- [Ship.h](#)
- [Ship.cpp](#)

3.17 SmokePoint Struct Reference

```
#include <Combined.h>
```

Public Attributes

- float [position](#) [3]
- float [speed](#) [3]
- float [color](#) [3]
- float [radius](#)
- int [life](#)
- float [initpos](#) [3]

3.17.1 Member Data Documentation

3.17.1.1 float SmokePoint::color
3.17.1.2 float SmokePoint::initpos
3.17.1.3 int SmokePoint::life
3.17.1.4 float SmokePoint::position
3.17.1.5 float SmokePoint::radius

3.17.1.6 float SmokePoint::speed

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

- [Combined.h](#)
- [CompCombined.h](#)

3.18 sortclass Struct Reference

Public Member Functions

- bool [operator\(\)](#) ([IDScore](#) a, [IDScore](#) b)
- bool [operator\(\)](#) ([IDScore](#) a, [IDScore](#) b)
- bool [operator\(\)](#) ([IDScore](#) a, [IDScore](#) b)

3.18.1 Member Function Documentation

3.18.1.1 bool [sortclass::operator\(\)](#) ([IDScore](#) a, [IDScore](#) b) [\[inline\]](#)

3.18.1.2 bool [sortclass::operator\(\)](#) ([IDScore](#) a, [IDScore](#) b) [\[inline\]](#)

3.18.1.3 bool [sortclass::operator\(\)](#) ([IDScore](#) a, [IDScore](#) b) [\[inline\]](#)

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

- [CompHighscore.cpp](#)
- [Highscore.cpp](#)
- [testmera.cpp](#)

3.19 Test Class Reference

```
#include <Test.h>
```

Public Member Functions

- [Test](#) (std::string [description](#))
- [~Test](#) ()
- void [VerifyTrue](#) (bool, std::string)
- void [VerifyFalse](#) (bool, std::string)
- bool [isPassed](#) ()

Private Member Functions

- void [PrintPassFail](#) (bool)

Private Attributes

- bool [verbose](#)
- std::string [description](#)
- bool [isPass](#)

3.19.1 Constructor & Destructor Documentation

3.19.1.1 `Test::Test (std::string description)`

3.19.1.2 `Test::~~Test ()`

3.19.2 Member Function Documentation

3.19.2.1 `bool Test::isPassed ()`

3.19.2.2 `void Test::PrintPassFail (bool pass)` `[private]`

3.19.2.3 `void Test::VerifyFalse (bool , std::string)`

3.19.2.4 `void Test::VerifyTrue (bool value, std::string testDescription)`

3.19.3 Member Data Documentation

3.19.3.1 `std::string Test::description` `[private]`

3.19.3.2 `bool Test::isPass` `[private]`

3.19.3.3 `bool Test::verbose` `[private]`

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

- [Test.h](#)
- [Test.cpp](#)

Chapter 4

File Documentation

4.1 AI.cpp File Reference

```
#include "AI.h"
```

Macros

- #define `theta` 45
- #define `minDistanceforRotation` 100
- #define `minAngleofRotation` 15
- #define `angularvelocity` 10
- #define `maximumdistance` 100000

Functions

- void `UpdateAIBoard` (`Board` &board)
- void `UpdatePlayerAI` (`Board` &board)
- void `UpdateAlien` (`Board` &board)
- void `UpdateAlienMissile` (`Board` &board)
- void `UpdateShipMissile` (`Board` &board)
- int `ClosestAlienEnemy` (std::vector< `Alien` > &Aliens, int NumberAliens, `Bullet` &actualmissile, double max-Distance)
- bool `InArc` (`Alien` &alien, `Bullet` &actualmissile)
- bool `InArc` (`Ship` &ship, `Bullet` &actualmissile)
- float `relativeAngle` (`Alien` &alien, `Bullet` &actualmissile)
- float `relativeAngle` (`Ship` &ship, `Bullet` &actualmissile)
- void `UpdateMissile` (`Board` &board)
- void `UpdateVelocity` (`Bullet` &actualmissile, `Ship` &ship)
- void `UpdateVelocity` (`Bullet` &actualmissile, `Alien` &alien)
- float `relativeAngletoMissile` (`Alien` &alien, `Bullet` &actualmissile)
- float `relativeAngletoMissile` (`Ship` &ship, `Bullet` &actualmissile)
- void `MoveInDirectionOf` (`Ship` &ship, `Alien` &alien)
- void `TurnInDirectionOf` (`Ship` &ship, `Alien` &alien)
- float `relativeAngle` (`Ship` &ship, `Alien` &alien)
- void `MoveInDirectionOf` (`Alien` &alien, `Ship` &ship)
- void `TurnInDirectionOf` (`Alien` &alien, `Ship` &ship)
- float `relativeAngle` (`Alien` &alien, `Ship` &ship)
- int `FindNearestAlien` (`Ship` &ship, std::vector< `Alien` > &CurrentAliens, bool nearEnough)

- int `FindNearestShip` (`Alien` &alien, std::vector< `Ship` > &CurrentShips, bool nearEnough)
- float `Distance` (`Alien` &alien, `Bullet` &actualmissile)
- float `Distance` (`Ship` &ship, `Bullet` &actualmissile)
- float `Distance` (`Ship` &ship, `Alien` &alien)
- int `ClosestShipEnemy` (std::vector< `Ship` > &Ships, int NumberShips, `Bullet` &actualmissile)

4.1.1 Macro Definition Documentation

4.1.1.1 `#define angularvelocity 10`

4.1.1.2 `#define maximumdistance 100000`

4.1.1.3 `#define minAngleofRotation 15`

4.1.1.4 `#define minDistanceforRotation 100`

4.1.1.5 `#define theta 45`

4.1.2 Function Documentation

4.1.2.1 int `ClosestAlienEnemy` (std::vector< `Alien` > & *Aliens*, int *NumberAliens*, `Bullet` & *actualmissile*, double *maxDistance*)

4.1.2.2 int `ClosestShipEnemy` (std::vector< `Ship` > & *Ships*, int *NumberShips*, `Bullet` & *actualmissile*)

4.1.2.3 float `Distance` (`Alien` & *alien*, `Bullet` & *actualmissile*)

4.1.2.4 float `Distance` (`Ship` & *ship*, `Bullet` & *actualmissile*)

4.1.2.5 float `Distance` (`Ship` & *ship*, `Alien` & *alien*)

4.1.2.6 int `FindNearestAlien` (`Ship` & *ship*, std::vector< `Alien` > & *CurrentAliens*, bool *nearEnough*)

4.1.2.7 int `FindNearestShip` (`Alien` & *alien*, std::vector< `Ship` > & *CurrentShips*, bool *nearEnough*)

4.1.2.8 bool `InArc` (`Alien` & *alien*, `Bullet` & *actualmissile*)

4.1.2.9 bool `InArc` (`Ship` & *ship*, `Bullet` & *actualmissile*)

4.1.2.10 void `MoveInDirectionOf` (`Ship` & *ship*, `Alien` & *alien*)

4.1.2.11 void `MoveInDirectionOf` (`Alien` & *alien*, `Ship` & *ship*)

4.1.2.12 float `relativeAngle` (`Alien` & *alien*, `Bullet` & *actualmissile*)

4.1.2.13 float `relativeAngle` (`Ship` & *ship*, `Bullet` & *actualmissile*)

4.1.2.14 float `relativeAngle` (`Ship` & *ship*, `Alien` & *alien*)

4.1.2.15 float `relativeAngle` (`Alien` & *alien*, `Ship` & *ship*)

4.1.2.16 float `relativeAngletoMissile` (`Alien` & *alien*, `Bullet` & *actualmissile*)

4.1.2.17 float `relativeAngletoMissile` (`Ship` & *ship*, `Bullet` & *actualmissile*)

- 4.1.2.18 void TurnInDirectionOf (Ship & ship, Alien & alien)
- 4.1.2.19 void TurnInDirectionOf (Alien & alien, Ship & ship)
- 4.1.2.20 void UpdateAIBoard (Board & board)
- 4.1.2.21 void UpdateAlien (Board & board)
- 4.1.2.22 void UpdateAlienMissile (Board & board)
- 4.1.2.23 void UpdateMissile (Board & board)
- 4.1.2.24 void UpdatePlayerAI (Board & board)
- 4.1.2.25 void UpdateShipMissile (Board & board)
- 4.1.2.26 void UpdateVelocity (Bullet & actualmissile, Ship & ship)
- 4.1.2.27 void UpdateVelocity (Bullet & actualmissile, Alien & alien)

4.2 AI.h File Reference

```
#include "Board.h"
#include <stdlib.h>
#include <time.h>
#include <limits.h>
```

Macros

- #define [theta](#) 15
- #define [minDistanceforRotation](#) 5000000
- #define [minAngleofRotation](#) 5
- #define [angularvelocity](#) 5
- #define [RIGHTANGLE](#) 90
- #define [ALIENMISSILE](#) -1
- #define [NOSHIP](#) -1
- #define [ANGLEOFVIEW](#) 45

Enumerations

- enum [WhatItShouldDo](#) { [Move](#), [Turn](#), [FireBullet](#), [FireMissile](#) }

Functions

- void [UpdatePlayerAI](#) (Board &board)
- void [UpdateAlien](#) (Board &board)
- void [UpdateMissile](#) (Board &board)
- void [UpdateAIBoard](#) (Board &board)
- void [UpdateAlienMissile](#) (Board &board)
- void [UpdateShipMissile](#) (Board &board)
- float [DistanceOfAlienFromMissile](#) (Alien &alien, Bullet &actualmissile)
- float [DistanceOfShipFromMissile](#) (Ship &ship, Bullet &actualmissile)

- float [DistanceOfShipFromAlien](#) ([Ship](#) &ship, [Alien](#) &alien)
- float [DistanceOfAlienFromShip](#) ([Alien](#) &alien, [Ship](#) &ship)
- int [ClosestAlienEnemy](#) (std::vector< [Alien](#) > &Aliens, int NumberAliens, [Bullet](#) &actualmissile, double max-Distance)
- int [ClosestShipEnemy](#) (std::vector< [Ship](#) > &Ships, int NumberShips, [Bullet](#) &actualmissile, double max-Distance)
- bool [ShipInArc](#) ([Ship](#) &ship, [Bullet](#) &actualmissile)
- bool [AlienInArc](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)
- float [RelativeAngleOfAlienFromShip](#) ([Alien](#) &alien, [Ship](#) &ship)
- float [RelativeAngleOfShipFromAlien](#) ([Ship](#) &ship, [Alien](#) &alien)
- float [RelativeAngleShipToMissilePosition](#) ([Ship](#) &ship, [Bullet](#) &actualmissile)
- float [RelativeAngleAlienToMissilePosition](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)
- float [RelativeAngleShipFromMissile](#) ([Ship](#) &ship, [Bullet](#) &actualmissile)
- float [RelativeAngleAlienFromMissile](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)
- void [UpdateAlienMissileVelocity](#) ([Bullet](#) &actualmissile, [Ship](#) &ship)
- void [UpdateShipMissileVelocity](#) ([Bullet](#) &actualmissile, [Alien](#) &alien)
- std::pair< int, bool > [FindNearestShip](#) ([Alien](#) &alien, std::vector< [Ship](#) > &CurrentShips)
- std::pair< int, bool > [FindNearestAlien](#) ([Ship](#) &ship, std::vector< [Alien](#) > &CurrentAliens)
- void [MoveAlienInDirectionOfShip](#) ([Alien](#) &alien, [Ship](#) &ship)
- void [TurnAlienInDirectionOfShip](#) ([Alien](#) &alien, [Ship](#) &ship, bool &finished)
- void [MoveShipInDirectionOfAlien](#) ([Ship](#) &ship, [Alien](#) &alien)
- void [TurnShipInDirectionOfAlien](#) ([Ship](#) &ship, [Alien](#) &alien, bool &finished)
- void [FireBulletForAlien](#) ([Alien](#) &alien, [Board](#) &board)
- void [FireMissileForAlien](#) ([Alien](#) &alien, [Board](#) &board)
- void [FireBulletForShip](#) ([Ship](#) &ship, [Board](#) &board)
- void [FireMissileForShip](#) ([Ship](#) &ship, [Board](#) &board)
- [WhatItShouldDo DecideActionForAlien](#) ([Board](#) &board, [Alien](#) &alien, bool nearEnough)
- [WhatItShouldDo DecideActionForShip](#) ([Board](#) &board, [Ship](#) &ship, bool nearEnough)
- bool [AliensInViewOfShip](#) ([Board](#) &board, [Ship](#) &ship)
- bool [ShipsInViewOfAlien](#) ([Board](#) &board, [Alien](#) &alien)

Variables

- int [POSX](#)
- int [NEGX](#)
- int [POSY](#)
- int [NEGY](#)

4.2.1 Macro Definition Documentation

4.2.1.1 `#define ALIENMISSILE -1`

4.2.1.2 `#define ANGLEOFVIEW 45`

4.2.1.3 `#define angularvelocity 5`

4.2.1.4 `#define minAngleofRotation 5`

4.2.1.5 `#define minDistanceforRotation 5000000`

4.2.1.6 `#define NOSHIP -1`

4.2.1.7 `#define RIGHTANGLE 90`

4.2.1.8 `#define theta 15`

4.2.2 Enumeration Type Documentation

4.2.2.1 `enum WhatItShouldDo`

Enumerator

Move

Turn

FireBullet

FireMissile

4.2.3 Function Documentation

4.2.3.1 `bool AlienInArc (Alien & alien, Bullet & actualmissile)`

4.2.3.2 `bool AlienInViewOfShip (Board & board, Ship & ship)`

4.2.3.3 `int ClosestAlienEnemy (std::vector< Alien > & Aliens, int NumberAliens, Bullet & actualmissile, double maxDistance)`

4.2.3.4 `int ClosestShipEnemy (std::vector< Ship > & Ships, int NumberShips, Bullet & actualmissile, double maxDistance)`

4.2.3.5 `WhatItShouldDo DecideActionForAlien (Board & board, Alien & alien, bool nearEnough)`

4.2.3.6 `WhatItShouldDo DecideActionForShip (Board & board, Ship & ship, bool nearEnough)`

4.2.3.7 `float DistanceOfAlienFromMissile (Alien & alien, Bullet & actualmissile)`

4.2.3.8 `float DistanceOfAlienFromShip (Alien & alien, Ship & ship)`

4.2.3.9 `float DistanceOfShipFromAlien (Ship & ship, Alien & alien)`

4.2.3.10 `float DistanceOfShipFromMissile (Ship & ship, Bullet & actualmissile)`

4.2.3.11 `std::pair<int,bool> FindNearestAlien (Ship & ship, std::vector< Alien > & CurrentAliens)`

4.2.3.12 `std::pair<int,bool> FindNearestShip (Alien & alien, std::vector< Ship > & CurrentShips)`

4.2.3.13 `void FireBulletForAlien (Alien & alien, Board & board)`

4.2.3.14 `void FireBulletForShip (Ship & ship, Board & board)`

4.2.3.15 `void FireMissileForAlien (Alien & alien, Board & board)`

4.2.3.16 `void FireMissileForShip (Ship & ship, Board & board)`

4.2.3.17 `void MoveAlienInDirectionOfShip (Alien & alien, Ship & ship)`

4.2.3.18 `void MoveShipInDirectionOfAlien (Ship & ship, Alien & alien)`

4.2.3.19 `float RelativeAngleAlienFromMissile (Alien & alien, Bullet & actualmissile)`

- 4.2.3.20 float RelativeAngleAlienToMissilePosition (Alien & alien, Bullet & actualmissile)
- 4.2.3.21 float RelativeAngleOfAlienFromShip (Alien & alien, Ship & ship)
- 4.2.3.22 float RelativeAngleOfShipFromAlien (Ship & ship, Alien & alien)
- 4.2.3.23 float RelativeAngleShipFromMissile (Ship & ship, Bullet & actualmissile)
- 4.2.3.24 float RelativeAngleShiptoMissilePosition (Ship & ship, Bullet & actualmissile)
- 4.2.3.25 bool ShipInArc (Ship & ship, Bullet & actualmissile)
- 4.2.3.26 bool ShipsInViewOfAlien (Board & board, Alien & alien)
- 4.2.3.27 void TurnAlienInDirectionOfShip (Alien & alien, Ship & ship, bool & finished)
- 4.2.3.28 void TurnShipInDirectionOfAlien (Ship & ship, Alien & alien, bool & finished)
- 4.2.3.29 void UpdateAIBoard (Board & board)
- 4.2.3.30 void UpdateAlien (Board & board)
- 4.2.3.31 void UpdateAlienMissile (Board & board)
- 4.2.3.32 void UpdateAlienMissileVelocity (Bullet & actualmissile, Ship & ship)
- 4.2.3.33 void UpdateMissile (Board & board)
- 4.2.3.34 void UpdatePlayerAI (Board & board)
- 4.2.3.35 void UpdateShipMissile (Board & board)
- 4.2.3.36 void UpdateShipMissileVelocity (Bullet & actualmissile, Alien & alien)

4.2.4 Variable Documentation

- 4.2.4.1 int NEGX
- 4.2.4.2 int NEGY
- 4.2.4.3 int POSX
- 4.2.4.4 int POSY

4.3 Alalien.cpp File Reference

```
#include "AI.h"
```

Functions

- [WhatItShouldDo DecideActionForAlien](#) (Board &board, Alien &alien, bool nearEnough)
- void [MoveAlienInDirectionOfShip](#) (Alien &alien, Ship &ship)
- void [TurnAlienInDirectionOfShip](#) (Alien &alien, Ship &ship, bool &finished)
- void [FireBulletForAlien](#) (Alien &alien, Board &board)

- void [FireMissileForAlien](#) ([Alien](#) &alien, [Board](#) &board)

4.3.1 Function Documentation

4.3.1.1 [WhatItShouldDo](#) [DecideActionForAlien](#) ([Board](#) & *board*, [Alien](#) & *alien*, bool *nearEnough*)

4.3.1.2 void [FireBulletForAlien](#) ([Alien](#) & *alien*, [Board](#) & *board*)

4.3.1.3 void [FireMissileForAlien](#) ([Alien](#) & *alien*, [Board](#) & *board*)

4.3.1.4 void [MoveAlienInDirectionOfShip](#) ([Alien](#) & *alien*, [Ship](#) & *ship*)

4.3.1.5 void [TurnAlienInDirectionOfShip](#) ([Alien](#) & *alien*, [Ship](#) & *ship*, bool & *finished*)

4.4 Alcomputation.cpp File Reference

```
#include "AI.h"
```

Functions

- int [ClosestAlienEnemy](#) (std::vector< [Alien](#) > &Aliens, int NumberAliens, [Bullet](#) &actualmissile, double max-Distance)
- int [ClosestShipEnemy](#) (std::vector< [Ship](#) > &Ships, int NumberShips, [Bullet](#) &actualmissile, double max-Distance)
- bool [AlienInArc](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)
- bool [ShipInArc](#) ([Ship](#) &ship, [Bullet](#) &actualmissile)
- float [RelativeAngleAlienFromMissile](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)
- float [RelativeAngleShipFromMissile](#) ([Ship](#) &ship, [Bullet](#) &actualmissile)
- float [RelativeAngleAlienToMissilePosition](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)
- float [RelativeAngleShipToMissilePosition](#) ([Ship](#) &ship, [Bullet](#) &actualmissile)
- float [RelativeAngleOfShipFromAlien](#) ([Ship](#) &ship, [Alien](#) &alien)
- float [RelativeAngleOfAlienFromShip](#) ([Alien](#) &alien, [Ship](#) &ship)
- std::pair< int, bool > [FindNearestAlien](#) ([Ship](#) &ship, std::vector< [Alien](#) > &CurrentAliens)
- std::pair< int, bool > [FindNearestShip](#) ([Alien](#) &alien, std::vector< [Ship](#) > &CurrentShips)
- float [DistanceOfAlienFromMissile](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)
- float [DistanceOfShipFromMissile](#) ([Ship](#) &ship, [Bullet](#) &actualmissile)
- float [DistanceOfShipFromAlien](#) ([Ship](#) &ship, [Alien](#) &alien)
- float [DistanceOfAlienFromShip](#) ([Alien](#) &alien, [Ship](#) &ship)
- bool [AlienIsInViewOfShip](#) ([Board](#) &board, [Ship](#) &ship)
- bool [ShipsInViewOfAlien](#) ([Board](#) &board, [Alien](#) &alien)

4.4.1 Function Documentation

4.4.1.1 bool [AlienInArc](#) ([Alien](#) & *alien*, [Bullet](#) & *actualmissile*)

4.4.1.2 bool [AlienIsInViewOfShip](#) ([Board](#) & *board*, [Ship](#) & *ship*)

4.4.1.3 int [ClosestAlienEnemy](#) (std::vector< [Alien](#) > & *Aliens*, int *NumberAliens*, [Bullet](#) & *actualmissile*, double *maxDistance*)

4.4.1.4 int [ClosestShipEnemy](#) (std::vector< [Ship](#) > & *Ships*, int *NumberShips*, [Bullet](#) & *actualmissile*, double *maxDistance*)

- 4.4.1.5 float DistanceOfAlienFromMissile (Alien & *alien*, Bullet & *actualmissile*)
- 4.4.1.6 float DistanceOfAlienFromShip (Alien & *alien*, Ship & *ship*)
- 4.4.1.7 float DistanceOfShipFromAlien (Ship & *ship*, Alien & *alien*)
- 4.4.1.8 float DistanceOfShipFromMissile (Ship & *ship*, Bullet & *actualmissile*)
- 4.4.1.9 std::pair<int,bool> FindNearestAlien (Ship & *ship*, std::vector< Alien > & *CurrentAliens*)
- 4.4.1.10 std::pair<int,bool> FindNearestShip (Alien & *alien*, std::vector< Ship > & *CurrentShips*)
- 4.4.1.11 float RelativeAngleAlienFromMissile (Alien & *alien*, Bullet & *actualmissile*)
- 4.4.1.12 float RelativeAngleAlienToMissilePosition (Alien & *alien*, Bullet & *actualmissile*)
- 4.4.1.13 float RelativeAngleOfAlienFromShip (Alien & *alien*, Ship & *ship*)
- 4.4.1.14 float RelativeAngleOfShipFromAlien (Ship & *ship*, Alien & *alien*)
- 4.4.1.15 float RelativeAngleShipFromMissile (Ship & *ship*, Bullet & *actualmissile*)
- 4.4.1.16 float RelativeAngleShipToMissilePosition (Ship & *ship*, Bullet & *actualmissile*)
- 4.4.1.17 bool ShipInArc (Ship & *ship*, Bullet & *actualmissile*)
- 4.4.1.18 bool ShipsInViewOfAlien (Board & *board*, Alien & *alien*)

4.5 AIMissile.cpp File Reference

```
#include "AI.h"
```

Functions

- void [UpdateAlienMissile](#) (Board &board)
- void [UpdateShipMissile](#) (Board &board)
- void [UpdateAlienMissileVelocity](#) (Bullet &actualmissile, Ship &ship)
- void [UpdateShipMissileVelocity](#) (Bullet &actualmissile, Alien &alien)

4.5.1 Function Documentation

- 4.5.1.1 void [UpdateAlienMissile](#) (Board & *board*)
- 4.5.1.2 void [UpdateAlienMissileVelocity](#) (Bullet & *actualmissile*, Ship & *ship*)
- 4.5.1.3 void [UpdateShipMissile](#) (Board & *board*)
- 4.5.1.4 void [UpdateShipMissileVelocity](#) (Bullet & *actualmissile*, Alien & *alien*)

4.6 AIOP.cpp File Reference

4.7 AIPlayer.cpp File Reference

```
#include "AI.h"
```

Functions

- [WhatItShouldDo DecideActionForShip](#) ([Board](#) &board, [Ship](#) &ship, bool nearEnough)
- void [MoveShipInDirectionOfAlien](#) ([Ship](#) &ship, [Alien](#) &alien)
- void [TurnShipInDirectionOfAlien](#) ([Ship](#) &ship, [Alien](#) &alien, bool &finished)
- void [FireBulletForShip](#) ([Ship](#) &ship, [Board](#) &board)
- void [FireMissileForShip](#) ([Ship](#) &ship, [Board](#) &board)

4.7.1 Function Documentation

4.7.1.1 [WhatItShouldDo DecideActionForShip](#) ([Board](#) & *board*, [Ship](#) & *ship*, bool *nearEnough*)

4.7.1.2 void [FireBulletForShip](#) ([Ship](#) & *ship*, [Board](#) & *board*)

4.7.1.3 void [FireMissileForShip](#) ([Ship](#) & *ship*, [Board](#) & *board*)

4.7.1.4 void [MoveShipInDirectionOfAlien](#) ([Ship](#) & *ship*, [Alien](#) & *alien*)

4.7.1.5 void [TurnShipInDirectionOfAlien](#) ([Ship](#) & *ship*, [Alien](#) & *alien*, bool & *finished*)

4.8 AIUpdate.cpp File Reference

```
#include "AI.h"
```

Functions

- void [UpdateAIBoard](#) ([Board](#) &board)
- void [UpdatePlayerAI](#) ([Board](#) &board)
- void [UpdateAlien](#) ([Board](#) &board)
- void [UpdateMissile](#) ([Board](#) &board)

4.8.1 Function Documentation

4.8.1.1 void [UpdateAIBoard](#) ([Board](#) & *board*)

4.8.1.2 void [UpdateAlien](#) ([Board](#) & *board*)

4.8.1.3 void [UpdateMissile](#) ([Board](#) & *board*)

4.8.1.4 void [UpdatePlayerAI](#) ([Board](#) & *board*)

4.9 Alien.cpp File Reference

```
#include "Alien.h"
```

4.10 Alien.h File Reference

```
#include <string>
#include "Color.h"
```

Classes

- class [Alien](#)

4.11 AllTests.cpp File Reference

```
#include "AllTests.h"
```

Functions

- bool [RunAllTests](#) ()
- int [main](#) ()

4.11.1 Function Documentation

4.11.1.1 int [main](#) ()

4.11.1.2 bool [RunAllTests](#) ()

4.12 AllTests.h File Reference

```
#include "ShipTest.h"
#include "Test.h"
```

Functions

- bool [RunAllTests](#) ()

4.12.1 Function Documentation

4.12.1.1 bool [RunAllTests](#) ()

4.13 backupcoop.cpp File Reference

```
#include "CompetitiveBoard.h"
```

Macros

- #define [toDigit](#)(c) (c-'0')

Functions

- std::string [ToFour](#) (std::string x)
- bool [PairCompare](#) (std::pair< int, std::string > x, std::pair< int, std::string > y)
- bool [MyFunction](#) (int i, int j)
- float [RandomFloat](#) (float a, float b)
- int [ConvertBool](#) (bool a)
- bool [ExtractBool](#) (int i)

4.13.1 Macro Definition Documentation

4.13.1.1 `#define toDigit(c) (c-'0')`

4.13.2 Function Documentation

4.13.2.1 `int ConvertBool (bool a)`

4.13.2.2 `bool ExtractBool (int i)`

4.13.2.3 `bool MyFunction (int i, int j)`

4.13.2.4 `bool PairCompare (std::pair< int, std::string > x, std::pair< int, std::string > y)`

4.13.2.5 `float RandomFloat (float a, float b)`

4.13.2.6 `std::string ToFour (std::string x)`

4.14 Board.cpp File Reference

```
#include "Board.h"
```

Macros

- `#define toDigit(c) (c-'0')`

Functions

- std::string [ToFour](#) (std::string x)
- bool [PairCompare](#) (std::pair< int, std::string > x, std::pair< int, std::string > y)
- bool [MyFunction](#) (int i, int j)
- float [RandomFloat](#) (float a, float b)
- int [ConvertBool](#) (bool a)
- bool [ExtractBool](#) (int i)

4.14.1 Macro Definition Documentation

4.14.1.1 `#define toDigit(c) (c-'0')`

4.14.2 Function Documentation

4.14.2.1 `int ConvertBool (bool a)`

4.14.2.2 `bool ExtractBool (int i)`

4.14.2.3 `bool MyFunction (int i, int j)`

4.14.2.4 `bool PairCompare (std::pair< int, std::string > x, std::pair< int, std::string > y)`

4.14.2.5 `float RandomFloat (float a, float b)`

4.14.2.6 `std::string ToFour (std::string x)`

4.15 Board.h File Reference

```
#include "Alien.h"
#include "Color.h"
#include "Bullet.h"
#include "Ship.h"
#include <vector>
#include <math.h>
#include <string>
#include <iostream>
#include <cstdlib>
#include <algorithm>
```

Classes

- struct [Points](#)
- class [Board](#)

Functions

- float [RandomFloat](#) (float, float)

4.15.1 Function Documentation

4.15.1.1 `float RandomFloat (float , float)`

4.16 Bullet.cpp File Reference

```
#include "Bullet.h"
#include <cstdlib>
```

4.17 Bullet.h File Reference

```
#include "Color.h"
#include <string>
#include <math.h>
#include <algorithm>
```


Classes

- class [Bullet](#)

Macros

- `#define` [PI](#) 3.14159265

4.17.1 Macro Definition Documentation

4.17.1.1 `#define` PI 3.14159265

4.18 Color.cpp File Reference

```
#include "Color.h"
```

4.19 Color.h File Reference

Classes

- class [Color](#)

4.20 Combined.cpp File Reference

```
#include "Combined.h"
```

Functions

- void * [sound_play1](#) (void *x)
- void * [sound_play2](#) (void *x)
- [Image](#) * [loadBMP](#) (const char *filename)
- GLuint [loadTexture](#) ([Image](#) *image)
- void [initRendering](#) ()
- std::vector< [Faces](#) > [loadOBJ](#) (char *path)
- void [ProcessKeys](#) ()
- void [specialKeys](#) (int key, int x, int y)
- void [specialKeysUp](#) (int key, int x, int y)
- void [handleKeypress](#) (unsigned char key, int x, int y)
- void [handleKeypressUp](#) (unsigned char key, int x, int y)
- void [mouseclick](#) (int button, int state, int x, int y)
- void [ShowObject](#) (std::vector< [Faces](#) > &facevect)
- void [ShowBullet](#) ([Bullet](#) &b)
- void [ShowMissile](#) ([Bullet](#) &b)
- void [ShowShip](#) ([Ship](#) &shiptodisplay)
- void [ShowAlien](#) ([Alien](#) &alientodisplay)
- void [ShowBorders](#) ()
- void [ShowTitle](#) ()
- void [ShowIp](#) ()

- void [ShowLives](#) ()
- void [ShowScores](#) ()
- void [ShowAllText](#) ()
- void [ShowBoard](#) ([Board](#) &boardtodisplay)
- void [newSpeed](#) (float dest[3])
- [Expl](#) [newExplosion](#) (float x, float y, float z)
- void [AddNewExplosion](#) (float x, float y, float z)
- void [UpdateFireExplosions](#) ()
- void [ShowFirePoint](#) ([FirePoint](#) &ptodisplay)
- void [ShowAllFirePoints](#) ()
- void [ShowExplosion](#) ([Expl](#) &exptodisplay)
- void [UpdateExplosion](#) ([Expl](#) &exptoupdate)
- void [UpdateAllExplosions](#) ()
- void [ShowSmokePoint](#) ([SmokePoint](#) &p)
- [SmokePoint](#) [NewSmokePoint](#) (float x, float y)
- void [UpdateSmokePoint](#) ([SmokePoint](#) &p)
- void [UpdateAllSmokePoints](#) (std::vector< [SmokePoint](#) > &v)
- void [DisplaySmokePoints](#) (std::vector< [SmokePoint](#) > &v)
- void [DisplayExplosions](#) (std::vector< [Expl](#) > &v)
- void * [networkmainhelper](#) (void *inp)
- void [ShowGameOver](#) ()
- void [display](#) (void)
- void * [UpdateGameThread](#) (void *x)
- void [mousepos](#) (int x, int y)
- int [main](#) (int argc, char *argv[])

Variables

- GLuint [_textureId](#)
- GLuint [_textureGameOver](#)
- GLuint [_textureHighScore](#)

4.20.1 Function Documentation

4.20.1.1 void [AddNewExplosion](#) (float x, float y, float z)

4.20.1.2 void [display](#) (void)

4.20.1.3 void [DisplayExplosions](#) (std::vector< [Expl](#) > & v)

4.20.1.4 void [DisplaySmokePoints](#) (std::vector< [SmokePoint](#) > & v)

4.20.1.5 void [handleKeypress](#) (unsigned char key, int x, int y)

4.20.1.6 void [handleKeypressUp](#) (unsigned char key, int x, int y)

4.20.1.7 void [initRendering](#) ()

4.20.1.8 [Image*](#) [loadBMP](#) (const char * filename)

4.20.1.9 std::vector<[Faces](#)> [loadOBJ](#) (char * path)

4.20.1.10 GLuint [loadTexture](#) ([Image](#) * image)

- 4.20.1.11 `int main (int argc, char * argv[])`
- 4.20.1.12 `void mouseclick (int button, int state, int x, int y)`
- 4.20.1.13 `void mousepos (int x, int y)`
- 4.20.1.14 `void* networkmainhelper (void * inp)`
- 4.20.1.15 `Expl newExplosion (float x, float y, float z)`
- 4.20.1.16 `SmokePoint NewSmokePoint (float x, float y)`
- 4.20.1.17 `void newSpeed (float dest[3])`
- 4.20.1.18 `void ProcessKeys ()`
- 4.20.1.19 `void ShowAlien (Alien & alientodisplay)`
- 4.20.1.20 `void ShowAllFirePoints ()`
- 4.20.1.21 `void ShowAllText ()`
- 4.20.1.22 `void ShowBoard (Board & boardtodisplay)`
- 4.20.1.23 `void ShowBorders ()`
- 4.20.1.24 `void ShowBullet (Bullet & b)`
- 4.20.1.25 `void ShowExplosion (Expl & exptodisplay)`
- 4.20.1.26 `void ShowFirePoint (FirePoint & ptodisplay)`
- 4.20.1.27 `void ShowGameOver ()`
- 4.20.1.28 `void ShowIp ()`
- 4.20.1.29 `void ShowLives ()`
- 4.20.1.30 `void ShowMissile (Bullet & b)`
- 4.20.1.31 `void ShowObject (std::vector< Faces > & facevect)`
- 4.20.1.32 `void ShowScores ()`
- 4.20.1.33 `void ShowShip (Ship & shiptodisplay)`
- 4.20.1.34 `void ShowSmokePoint (SmokePoint & p)`
- 4.20.1.35 `void ShowTitle ()`
- 4.20.1.36 `void* sound_play1 (void * x)`
- 4.20.1.37 `void* sound_play2 (void * x)`
- 4.20.1.38 `void specialKeys (int key, int x, int y)`

4.20.1.39 void specialKeysUp (int *key*, int *x*, int *y*)

4.20.1.40 void UpdateAllExplosions ()

4.20.1.41 void UpdateAllSmokePoints (std::vector< SmokePoint > & *v*)

4.20.1.42 void UpdateExplosion (Expl & *exptoupdate*)

4.20.1.43 void UpdateFireExplosions ()

4.20.1.44 void* UpdateGameThread (void * *x*)

4.20.1.45 void UpdateSmokePoint (SmokePoint & *p*)

4.20.2 Variable Documentation

4.20.2.1 GLuint _textureGameOver

4.20.2.2 GLuint _textureHighScore

4.20.2.3 GLuint _textureId

4.21 Combined.h File Reference

```
#include "Board.h"
#include "udp.h"
#include <time.h>
#include "AI.h"
#include <GL/glut.h>
#include <GL/gl.h>
#include <iostream>
#include <math.h>
#include <cstdio>
#include <cstring>
#include <pthread.h>
#include <GL/freeglut.h>
#include <fstream>
#include "Image.h"
#include "Highscore.h"
```

Classes

- struct [Faces](#)
- struct [particleData](#)
- struct [debrisData](#)
- struct [Expl](#)
- struct [GamePlay](#)
- struct [Graph](#)
- struct [SmokePoint](#)
- struct [FirePoint](#)

Macros

- #define [NUM_PARTICLES](#) 1000 /* Number of particles */

- `#define NUM_DEBRIS 70 /* Number of debris */`

Functions

- `std::vector< Faces > loadOBJ (char *path)`
- `void ProcessKeys ()`
- `void specialKeys (int key, int x, int y)`
- `void specialKeysUp (int key, int x, int y)`
- `void handleKeypress (unsigned char key, int x, int y)`
- `void handleKeypressUp (unsigned char key, int x, int y)`
- `void mouseclick (int, int, int, int)`
- `void ShowObject (std::vector< Faces > &)`
- `void ShowBullet (Bullet &)`
- `void ShowMissile (Bullet &)`
- `void ShowShip (Ship &)`
- `void ShowBorders ()`
- `void ShowTitle ()`
- `void ShowIp ()`
- `void ShowLives ()`
- `void ShowScores ()`
- `void ShowAllText ()`
- `void ShowBoard (Board &)`
- `Expl newExplosion (float x, float y, float z)`
- `void AddNewExplosion (float x, float y, float z)`
- `void UpdateFireExplosions ()`
- `void ShowExplosion (Expl &)`
- `void UpdateAllExplosions ()`
- `void ShowSmokePoint (SmokePoint &)`
- `SmokePoint NewSmokePoint (float, float)`
- `void UpdateSmokePoint (SmokePoint &)`
- `void UpdateAllSmokePoints (std::vector< SmokePoint > &)`
- `void DisplaySmokePoints (std::vector< SmokePoint > &)`
- `void DisplayExplosions (std::vector< Expl > &)`
- `void * networkmainhelper (void *)`
- `void display (void)`

Variables

- `std::vector< Faces > alien1gun`
- `std::vector< Faces > alien1col`
- `std::vector< Faces > alien1top`
- `std::vector< Faces > alien1mid`
- `std::vector< Faces > alien2gun`
- `std::vector< Faces > alien2eye`
- `std::vector< Faces > alien2body`
- `std::vector< Faces > alien2top`
- `std::vector< Faces > shipcol`
- `std::vector< Faces > shipmid`
- `std::vector< Faces > shipfir`
- `std::vector< Faces > missiletop`
- `std::vector< Faces > missilemid`
- `std::vector< Faces > missileend`
- `std::vector< Faces > bullettop`
- `std::vector< Faces > bulletmid`

- `std::vector< Points > Stars`
- `std::vector< Expl > Explosions`
- `std::vector< SmokePoint > SmokePoints`
- `std::vector< SmokePoint > SmokePointsMissile`
- `std::vector< FirePoint > FirePoints`
- `std::queue< Bullet > BulletsToAdd`
- `int presentf`
- `bool viewtotake`
- `std::queue< std::string > Instructions`
- `bool playersReady`
- `bool isOffline`
- `bool Is_SoundExpl`
- `bool Is_SoundBullet`
- `float PX`
- `float PY`
- `float NX`
- `float NY`
- `int POSX`
- `int POSY`
- `int NEGX`
- `int NEGY`
- `std::string IPAddress`
- `bool NewHighScore`
- `int ID`
- `unsigned char * titleptr`
- `bool Keys [9]`
- `int SpaceBarFree`
- `GamePlay newg`
- `bool GameActive`
- `bool GameOver`
- `bool doneonce`
- `bool SingleMode`
- `bool MultiMode`
- `bool OnFrontScreen`
- `std::vector< std::string > highscorestodisplay`
- `std::vector< std::string > rankingtodisplay`

4.21.1 Macro Definition Documentation

4.21.1.1 `#define NUM_DEBRIS 70 /* Number of debris */`

4.21.1.2 `#define NUM_PARTICLES 1000 /* Number of particles */`

4.21.2 Function Documentation

4.21.2.1 `void AddNewExplosion (float x, float y, float z)`

4.21.2.2 `void display (void)`

4.21.2.3 `void DisplayExplosions (std::vector< Expl > &)`

4.21.2.4 `void DisplaySmokePoints (std::vector< SmokePoint > &)`

4.21.2.5 `void handleKeypress (unsigned char key, int x, int y)`

- 4.21.2.6 void handleKeypressUp (unsigned char *key*, int *x*, int *y*)
- 4.21.2.7 std::vector<Faces> loadOBJ (char * *path*)
- 4.21.2.8 void mouseclick (int , int , int , int)
- 4.21.2.9 void* networkmainhelper (void *)
- 4.21.2.10 Expl newExplosion (float *x*, float *y*, float *z*)
- 4.21.2.11 SmokePoint NewSmokePoint (float , float)
- 4.21.2.12 void ProcessKeys ()
- 4.21.2.13 void ShowAllText ()
- 4.21.2.14 void ShowBoard (Board &)
- 4.21.2.15 void ShowBorders ()
- 4.21.2.16 void ShowBullet (Bullet &)
- 4.21.2.17 void ShowExplosion (Expl &)
- 4.21.2.18 void ShowIp ()
- 4.21.2.19 void ShowLives ()
- 4.21.2.20 void ShowMissile (Bullet &)
- 4.21.2.21 void ShowObject (std::vector< Faces > &)
- 4.21.2.22 void ShowScores ()
- 4.21.2.23 void ShowShip (Ship &)
- 4.21.2.24 void ShowSmokePoint (SmokePoint &)
- 4.21.2.25 void ShowTitle ()
- 4.21.2.26 void specialKeys (int *key*, int *x*, int *y*)
- 4.21.2.27 void specialKeysUp (int *key*, int *x*, int *y*)
- 4.21.2.28 void UpdateAllExplosions ()
- 4.21.2.29 void UpdateAllSmokePoints (std::vector< SmokePoint > &)
- 4.21.2.30 void UpdateFireExplosions ()
- 4.21.2.31 void UpdateSmokePoint (SmokePoint &)

4.21.3 Variable Documentation

- 4.21.3.1 std::vector<Faces> alien1col

4.21.3.2 `std::vector<Faces>` alien1gun

4.21.3.3 `std::vector<Faces>` alien1mid

4.21.3.4 `std::vector<Faces>` alien1top

4.21.3.5 `std::vector<Faces>` alien2body

4.21.3.6 `std::vector<Faces>` alien2eye

4.21.3.7 `std::vector<Faces>` alien2gun

4.21.3.8 `std::vector<Faces>` alien2top

4.21.3.9 `std::vector<Faces>` bulletmid

4.21.3.10 `std::queue<Bullet>` BulletsToAdd

4.21.3.11 `std::vector<Faces>` bullettop

4.21.3.12 `bool` doneonce

4.21.3.13 `std::vector<Expl>` Explosions

4.21.3.14 `std::vector<FirePoint>` FirePoints

4.21.3.15 `bool` GameActive

4.21.3.16 `bool` GameOver

4.21.3.17 `std::vector<std::string>` highscorestodisplay

4.21.3.18 `int` ID

4.21.3.19 `std::queue<std::string>` Instructions

4.21.3.20 `std::string` IPAddress

4.21.3.21 `bool` Is_SoundBullet

4.21.3.22 `bool` Is_SoundExpl

4.21.3.23 `bool` isOffline

4.21.3.24 `bool` Keys[9]

4.21.3.25 `std::vector<Faces>` missileend

4.21.3.26 `std::vector<Faces>` missilemid

4.21.3.27 `std::vector<Faces>` missiletop

4.21.3.28 `bool` MultiMode

4.21.3.29 `int` NEGX

4.21.3.30 int NEGY

4.21.3.31 **GamePlay** newg

4.21.3.32 bool NewHighScore

4.21.3.33 float NX

4.21.3.34 float NY

4.21.3.35 bool OnFrontScreen

4.21.3.36 bool playersReady

4.21.3.37 int POSX

4.21.3.38 int POSY

4.21.3.39 int presentf

4.21.3.40 float PX

4.21.3.41 float PY

4.21.3.42 **std::vector<std::string>** rankingtodisplay

4.21.3.43 **std::vector<Faces>** shipcol

4.21.3.44 **std::vector<Faces>** shipfir

4.21.3.45 **std::vector<Faces>** shipmid

4.21.3.46 bool SingleMode

4.21.3.47 **std::vector<SmokePoint>** SmokePoints

4.21.3.48 **std::vector<SmokePoint>** SmokePointsMissile

4.21.3.49 int SpaceBarFree

4.21.3.50 **std::vector<Points>** Stars

4.21.3.51 unsigned char* titleptr

4.21.3.52 bool viewtotake

4.22 CompCombined.cpp File Reference

```
#include "CompCombined.h"
```

Functions

- void * [sound_play1](#) (void *x)
- void * [sound_play2](#) (void *x)

- [Image](#) * [loadBMP](#) (const char *filename)
- GLuint [loadTexture](#) ([Image](#) *image)
- void [initRendering](#) ()
- std::vector< [Faces](#) > [loadOBJ](#) (char *path)
- void [ProcessKeys](#) ()
- void [specialKeys](#) (int key, int x, int y)
- void [specialKeysUp](#) (int key, int x, int y)
- void [handleKeypress](#) (unsigned char key, int x, int y)
- void [handleKeypressUp](#) (unsigned char key, int x, int y)
- void [mouseclick](#) (int button, int state, int x, int y)
- void [ShowObject](#) (std::vector< [Faces](#) > &facevect)
- void [ShowBullet](#) ([Bullet](#) &b)
- void [ShowMissile](#) ([Bullet](#) &b)
- void [ShowShip](#) ([Ship](#) &shiptodisplay)
- void [ShowAlien](#) ([Alien](#) &alienodisplay)
- void [ShowBorders](#) ()
- void [ShowTitle](#) ()
- void [ShowIp](#) ()
- void [ShowLives](#) ()
- void [ShowScores](#) ()
- void [ShowAllText](#) ()
- void [ShowBoard](#) ([Board](#) &boardtodisplay)
- void [newSpeed](#) (float dest[3])
- [Expl](#) [newExplosion](#) (float x, float y, float z)
- void [AddNewExplosion](#) (float x, float y, float z)
- void [UpdateFireExplosions](#) ()
- void [ShowFirePoint](#) ([FirePoint](#) &ptodisplay)
- void [ShowAllFirePoints](#) ()
- void [ShowExplosion](#) ([Expl](#) &exptodisplay)
- void [UpdateExplosion](#) ([Expl](#) &exptoupdate)
- void [UpdateAllExplosions](#) ()
- void [ShowSmokePoint](#) ([SmokePoint](#) &p)
- [SmokePoint](#) [NewSmokePoint](#) (float x, float y)
- void [UpdateSmokePoint](#) ([SmokePoint](#) &p)
- void [UpdateAllSmokePoints](#) (std::vector< [SmokePoint](#) > &v)
- void [DisplaySmokePoints](#) (std::vector< [SmokePoint](#) > &v)
- void [DisplayExplosions](#) (std::vector< [Expl](#) > &v)
- void * [networkmainhelper](#) (void *inp)
- void [ShowGameOver](#) ()
- void [display](#) (void)
- void * [UpdateGameThread](#) (void *x)
- void [mousepos](#) (int x, int y)
- int [main](#) (int argc, char *argv[])

Variables

- GLuint [_textureId](#)
- GLuint [_textureGameOver](#)
- GLuint [_textureHighScore](#)

4.22.1 Function Documentation

- 4.22.1.1 void AddNewExplosion (float *x*, float *y*, float *z*)
- 4.22.1.2 void display (void)
- 4.22.1.3 void DisplayExplosions (std::vector< Expl > & *v*)
- 4.22.1.4 void DisplaySmokePoints (std::vector< SmokePoint > & *v*)
- 4.22.1.5 void handleKeypress (unsigned char *key*, int *x*, int *y*)
- 4.22.1.6 void handleKeypressUp (unsigned char *key*, int *x*, int *y*)
- 4.22.1.7 void initRendering ()
- 4.22.1.8 Image* loadBMP (const char * *filename*)
- 4.22.1.9 std::vector<Faces> loadOBJ (char * *path*)
- 4.22.1.10 GLuint loadTexture (Image * *image*)
- 4.22.1.11 int main (int *argc*, char * *argv*[])
- 4.22.1.12 void mouseclick (int *button*, int *state*, int *x*, int *y*)
- 4.22.1.13 void mousepos (int *x*, int *y*)
- 4.22.1.14 void* networkmainhelper (void * *inp*)
- 4.22.1.15 Expl newExplosion (float *x*, float *y*, float *z*)
- 4.22.1.16 SmokePoint NewSmokePoint (float *x*, float *y*)
- 4.22.1.17 void newSpeed (float *dest*[3])
- 4.22.1.18 void ProcessKeys ()
- 4.22.1.19 void ShowAlien (Alien & *alientodisplay*)
- 4.22.1.20 void ShowAllFirePoints ()
- 4.22.1.21 void ShowAllText ()
- 4.22.1.22 void ShowBoard (Board & *boardtodisplay*)
- 4.22.1.23 void ShowBorders ()
- 4.22.1.24 void ShowBullet (Bullet & *b*)
- 4.22.1.25 void ShowExplosion (Expl & *exptodisplay*)
- 4.22.1.26 void ShowFirePoint (FirePoint & *ptodisplay*)
- 4.22.1.27 void ShowGameOver ()

- 4.22.1.28 void ShowIp ()
- 4.22.1.29 void ShowLives ()
- 4.22.1.30 void ShowMissile (**Bullet** & *b*)
- 4.22.1.31 void ShowObject (std::vector< **Faces** > & *facevect*)
- 4.22.1.32 void ShowScores ()
- 4.22.1.33 void ShowShip (**Ship** & *shiptodisplay*)
- 4.22.1.34 void ShowSmokePoint (**SmokePoint** & *p*)
- 4.22.1.35 void ShowTitle ()
- 4.22.1.36 void* sound_play1 (void * *x*)
- 4.22.1.37 void* sound_play2 (void * *x*)
- 4.22.1.38 void specialKeys (int *key*, int *x*, int *y*)
- 4.22.1.39 void specialKeysUp (int *key*, int *x*, int *y*)
- 4.22.1.40 void UpdateAllExplosions ()
- 4.22.1.41 void UpdateAllSmokePoints (std::vector< **SmokePoint** > & *v*)
- 4.22.1.42 void UpdateExplosion (**Expl** & *exptoupdate*)
- 4.22.1.43 void UpdateFireExplosions ()
- 4.22.1.44 void* UpdateGameThread (void * *x*)
- 4.22.1.45 void UpdateSmokePoint (**SmokePoint** & *p*)

4.22.2 Variable Documentation

- 4.22.2.1 GLuint _textureGameOver
- 4.22.2.2 GLuint _textureHighScore
- 4.22.2.3 GLuint _textureId

4.23 CompCombined.h File Reference

```
#include "CompetitiveBoard.h"
#include "udp.h"
#include <time.h>
#include "OPAI.h"
#include <GL/glut.h>
#include <GL/gl.h>
#include <iostream>
#include <math.h>
#include <cstdio>
#include <cstring>
#include <pthread.h>
#include <GL/freeglut.h>
#include <fstream>
#include "Image.h"
#include "CompHighscore.h"
```

Classes

- struct [Faces](#)
- struct [particleData](#)
- struct [debrisData](#)
- struct [Expl](#)
- struct [GamePlay](#)
- struct [Graph](#)
- struct [SmokePoint](#)
- struct [FirePoint](#)

Macros

- #define [NUM_PARTICLES](#) 1000 /* Number of particles */
- #define [NUM_DEBRIS](#) 70 /* Number of debris */

Functions

- std::vector< [Faces](#) > [loadOBJ](#) (char *path)
- void [ProcessKeys](#) ()
- void [specialKeys](#) (int key, int x, int y)
- void [specialKeysUp](#) (int key, int x, int y)
- void [handleKeypress](#) (unsigned char key, int x, int y)
- void [handleKeypressUp](#) (unsigned char key, int x, int y)
- void [mouseclick](#) (int, int, int, int)
- void [ShowObject](#) (std::vector< [Faces](#) > &)
- void [ShowBullet](#) ([Bullet](#) &)
- void [ShowMissile](#) ([Bullet](#) &)
- void [ShowShip](#) ([Ship](#) &)
- void [ShowBorders](#) ()
- void [ShowTitle](#) ()
- void [ShowIp](#) ()
- void [ShowLives](#) ()
- void [ShowScores](#) ()
- void [ShowAllText](#) ()

- void `ShowBoard` (`Board` &)
- `Expl` `newExplosion` (float x, float y, float z)
- void `AddNewExplosion` (float x, float y, float z)
- void `UpdateFireExplosions` ()
- void `ShowExplosion` (`Expl` &)
- void `UpdateAllExplosions` ()
- void `ShowSmokePoint` (`SmokePoint` &)
- `SmokePoint` `NewSmokePoint` (float, float)
- void `UpdateSmokePoint` (`SmokePoint` &)
- void `UpdateAllSmokePoints` (std::vector< `SmokePoint` > &)
- void `DisplaySmokePoints` (std::vector< `SmokePoint` > &)
- void `DisplayExplosions` (std::vector< `Expl` > &)
- void * `networkmainhelper` (void *)
- void `display` (void)

Variables

- std::vector< `Faces` > `alien1gun`
- std::vector< `Faces` > `alien1col`
- std::vector< `Faces` > `alien1top`
- std::vector< `Faces` > `alien1mid`
- std::vector< `Faces` > `alien2gun`
- std::vector< `Faces` > `alien2eye`
- std::vector< `Faces` > `alien2body`
- std::vector< `Faces` > `alien2top`
- std::vector< `Faces` > `shipcol`
- std::vector< `Faces` > `shipmid`
- std::vector< `Faces` > `shipfir`
- std::vector< `Faces` > `missiletop`
- std::vector< `Faces` > `missilemid`
- std::vector< `Faces` > `missileend`
- std::vector< `Faces` > `bullettop`
- std::vector< `Faces` > `bulletmid`
- std::vector< `Points` > `Stars`
- std::vector< `Expl` > `Explosions`
- std::vector< `SmokePoint` > `SmokePoints`
- std::vector< `SmokePoint` > `SmokePointsMissile`
- std::vector< `FirePoint` > `FirePoints`
- std::queue< `Bullet` > `BulletsToAdd`
- int `presentf`
- bool `viewtotake`
- std::queue< std::string > `Instructions`
- bool `playersReady`
- bool `isOffline`
- bool `Is_SoundExpl`
- bool `Is_SoundBullet`
- float `PX`
- float `PY`
- float `NX`
- float `NY`
- int `POSX`
- int `POSY`
- int `NEGX`
- int `NEGY`

- std::string [IPAddress](#)
- bool [NewHighScore](#)
- int [ID](#)
- unsigned char * [titleptr](#)
- bool [Keys](#) [9]
- int [SpaceBarFree](#)
- [GamePlay](#) [newg](#)
- bool [GameActive](#)
- bool [GameOver](#)
- bool [doneonce](#)
- std::vector< std::string > [highscorestodisplay](#)
- std::vector< std::string > [rankingtodisplay](#)

4.23.1 Macro Definition Documentation

4.23.1.1 `#define NUM_DEBRIS 70 /* Number of debris */`

4.23.1.2 `#define NUM_PARTICLES 1000 /* Number of particles */`

4.23.2 Function Documentation

4.23.2.1 `void AddNewExplosion (float x, float y, float z)`

4.23.2.2 `void display (void)`

4.23.2.3 `void DisplayExplosions (std::vector< Expl > &)`

4.23.2.4 `void DisplaySmokePoints (std::vector< SmokePoint > &)`

4.23.2.5 `void handleKeypress (unsigned char key, int x, int y)`

4.23.2.6 `void handleKeypressUp (unsigned char key, int x, int y)`

4.23.2.7 `std::vector<Faces> loadOBJ (char * path)`

4.23.2.8 `void mouseclick (int , int , int , int)`

4.23.2.9 `void* networkmainhelper (void *)`

4.23.2.10 `Expl newExplosion (float x, float y, float z)`

4.23.2.11 `SmokePoint NewSmokePoint (float , float)`

4.23.2.12 `void ProcessKeys ()`

4.23.2.13 `void ShowAllText ()`

4.23.2.14 `void ShowBoard (Board &)`

4.23.2.15 `void ShowBorders ()`

4.23.2.16 `void ShowBullet (Bullet &)`

4.23.2.17 `void ShowExplosion (Expl &)`

- 4.23.2.18 void ShowIp ()
- 4.23.2.19 void ShowLives ()
- 4.23.2.20 void ShowMissile (**Bullet** &)
- 4.23.2.21 void ShowObject (std::vector< **Faces** > &)
- 4.23.2.22 void ShowScores ()
- 4.23.2.23 void ShowShip (**Ship** &)
- 4.23.2.24 void ShowSmokePoint (**SmokePoint** &)
- 4.23.2.25 void ShowTitle ()
- 4.23.2.26 void specialKeys (int *key*, int *x*, int *y*)
- 4.23.2.27 void specialKeysUp (int *key*, int *x*, int *y*)
- 4.23.2.28 void UpdateAllExplosions ()
- 4.23.2.29 void UpdateAllSmokePoints (std::vector< **SmokePoint** > &)
- 4.23.2.30 void UpdateFireExplosions ()
- 4.23.2.31 void UpdateSmokePoint (**SmokePoint** &)

4.23.3 Variable Documentation

- 4.23.3.1 std::vector<**Faces**> alien1col
- 4.23.3.2 std::vector<**Faces**> alien1gun
- 4.23.3.3 std::vector<**Faces**> alien1mid
- 4.23.3.4 std::vector<**Faces**> alien1top
- 4.23.3.5 std::vector<**Faces**> alien2body
- 4.23.3.6 std::vector<**Faces**> alien2eye
- 4.23.3.7 std::vector<**Faces**> alien2gun
- 4.23.3.8 std::vector<**Faces**> alien2top
- 4.23.3.9 std::vector<**Faces**> bulletmid
- 4.23.3.10 std::queue<**Bullet**> BulletsToAdd
- 4.23.3.11 std::vector<**Faces**> bullettop
- 4.23.3.12 bool doneonce
- 4.23.3.13 std::vector<**Expl**> Explosions

- 4.23.3.14 `std::vector<FirePoint> FirePoints`
- 4.23.3.15 `bool GameActive`
- 4.23.3.16 `bool GameOver`
- 4.23.3.17 `std::vector<std::string> highscorestodisplay`
- 4.23.3.18 `int ID`
- 4.23.3.19 `std::queue<std::string> Instructions`
- 4.23.3.20 `std::string IPAddress`
- 4.23.3.21 `bool Is_SoundBullet`
- 4.23.3.22 `bool Is_SoundExpl`
- 4.23.3.23 `bool isOffline`
- 4.23.3.24 `bool Keys[9]`
- 4.23.3.25 `std::vector<Faces> missileend`
- 4.23.3.26 `std::vector<Faces> missilemid`
- 4.23.3.27 `std::vector<Faces> missiletop`
- 4.23.3.28 `int NEGX`
- 4.23.3.29 `int NEGY`
- 4.23.3.30 `GamePlay newg`
- 4.23.3.31 `bool NewHighScore`
- 4.23.3.32 `float NX`
- 4.23.3.33 `float NY`
- 4.23.3.34 `bool playersReady`
- 4.23.3.35 `int POSX`
- 4.23.3.36 `int POSY`
- 4.23.3.37 `int presentf`
- 4.23.3.38 `float PX`
- 4.23.3.39 `float PY`
- 4.23.3.40 `std::vector<std::string> rankingtodisplay`
- 4.23.3.41 `std::vector<Faces> shipcol`

- 4.23.3.42 `std::vector<Faces>` shipfir
- 4.23.3.43 `std::vector<Faces>` shipmid
- 4.23.3.44 `std::vector<SmokePoint>` SmokePoints
- 4.23.3.45 `std::vector<SmokePoint>` SmokePointsMissile
- 4.23.3.46 `int` SpaceBarFree
- 4.23.3.47 `std::vector<Points>` Stars
- 4.23.3.48 `unsigned char*` titleptr
- 4.23.3.49 `bool` viewtotake

4.24 CompetitiveBoard.cpp File Reference

```
#include "Board.h"
```

Macros

- `#define toDigit(c) (c-'0')`

Functions

- `std::string ToFour` (`std::string x`)
- `bool PairCompare` (`std::pair< int, std::string > x, std::pair< int, std::string > y`)
- `bool MyFunction` (`int i, int j`)
- `float RandomFloat` (`float a, float b`)
- `int ConvertBool` (`bool a`)
- `bool ExtractBool` (`int i`)

4.24.1 Macro Definition Documentation

4.24.1.1 `#define toDigit(c) (c-'0')`

4.24.2 Function Documentation

4.24.2.1 `int ConvertBool (bool a)`

4.24.2.2 `bool ExtractBool (int i)`

4.24.2.3 `bool MyFunction (int i, int j)`

4.24.2.4 `bool PairCompare (std::pair< int, std::string > x, std::pair< int, std::string > y)`

4.24.2.5 `float RandomFloat (float a, float b)`

4.24.2.6 `std::string ToFour (std::string x)`

4.25 CompetitiveBoard.h File Reference

```
#include "Alien.h"
#include "Color.h"
#include "Bullet.h"
#include "Ship.h"
#include <vector>
#include <math.h>
#include <string>
#include <iostream>
#include <cstdlib>
#include <algorithm>
```

Classes

- struct [Points](#)
- class [Board](#)

Functions

- float [RandomFloat](#) (float, float)

4.25.1 Function Documentation

4.25.1.1 float [RandomFloat](#) (float , float)

4.26 CompHighscore.cpp File Reference

```
#include "CompHighscore.h"
```

Classes

- struct [IDScore](#)
- struct [sortclass](#)

Functions

- std::string [ToFour1](#) (std::string x)
- std::vector< std::string > [UpdateHighScores](#) ([Board](#) &board)

Variables

- struct [sortclass](#) [sortobject](#)

4.26.1 Function Documentation

4.26.1.1 std::string [ToFour1](#) (std::string x)

4.26.1.2 `std::vector<std::string> UpdateHighScores (Board & board)`

4.26.2 Variable Documentation

4.26.2.1 `struct sortclass sortobject`

4.27 CompHighscore.h File Reference

```
#include <iostream>
#include <fstream>
#include <vector>
#include <string>
#include <cstdio>
#include <algorithm>
#include "CompetitiveBoard.h"
```

Functions

- `std::vector< std::string > UpdateHighScores (Board &)`

Variables

- `bool NewHighScore`
- `int ID`

4.27.1 Function Documentation

4.27.1.1 `std::vector<std::string> UpdateHighScores (Board &)`

4.27.2 Variable Documentation

4.27.2.1 `int ID`

4.27.2.2 `bool NewHighScore`

4.28 Highscore.cpp File Reference

```
#include "Highscore.h"
```

Classes

- `struct IDScore`
- `struct sortclass`

Functions

- `std::string ToFour1 (std::string x)`
- `std::vector< std::string > UpdateHighScores (Board &board)`

Variables

- struct [sortclass sortobject](#)

4.28.1 Function Documentation

4.28.1.1 `std::string ToFour1 (std::string x)`

4.28.1.2 `std::vector<std::string> UpdateHighScores (Board & board)`

4.28.2 Variable Documentation

4.28.2.1 `struct sortclass sortobject`

4.29 Highscore.h File Reference

```
#include <iostream>
#include <fstream>
#include <vector>
#include <string>
#include <cstdio>
#include <algorithm>
#include "Board.h"
```

Functions

- `std::vector< std::string > UpdateHighScores (Board &)`

Variables

- bool [NewHighScore](#)
- int [ID](#)

4.29.1 Function Documentation

4.29.1.1 `std::vector<std::string> UpdateHighScores (Board &)`

4.29.2 Variable Documentation

4.29.2.1 `int ID`

4.29.2.2 `bool NewHighScore`

4.30 Image.cpp File Reference

```
#include "Image.h"
```

4.31 Image.h File Reference

```
#include <assert.h>
#include <fstream>
```

Classes

- class [Image](#)

Functions

- [Image](#) * [loadBMP](#) (const char *filename)

4.31.1 Function Documentation

4.31.1.1 [Image](#)* [loadBMP](#) (const char * *filename*)

4.32 mousepos.cpp File Reference

Functions

- void [mousepos](#) (int x, int y)
- [glutPassiveMotionFunc](#) ([mousepos](#))

4.32.1 Function Documentation

4.32.1.1 [glutPassiveMotionFunc](#) ([mousepos](#))

4.32.1.2 void [mousepos](#) (int x, int y)

4.33 OPAI.h File Reference

```
#include "CompetitiveBoard.h"
#include <cstdlib>
#include <time.h>
#include <limits.h>
```

Macros

- #define [theta](#) 15
- #define [minDistanceforRotation](#) 5000000
- #define [minAngleofRotation](#) 5
- #define [angularvelocity](#) 5
- #define [RIGHTANGLE](#) 90
- #define [ALIENMISSILE](#) -1
- #define [NOSHIP](#) -1
- #define [ANGLEOFVIEW](#) 45

Functions

- void `OPMoveShipInDirectionOfShip` (`Ship` &ship1, `Ship` &ship2)
- void `OPTurnShipInDirectionOfShip` (`Ship` &ship1, `Ship` &ship2, bool &finished)
- void `OPUpdateAIBoard` (`Board` &board)
- void `OPUpdatePlayerAI` (`Board` &board)
- void `OPUpdateMissile` (`Board` &board)
- void `OPUpdateShipMissile` (`Board` &board)
- float `OPRelativeAngleShipFromMissile` (`Ship` &ship, `Bullet` &actualmissile)
- void `OPUpdateShipMissileVelocity` (`Bullet` &actualmissile, `Ship` &ship2)
- void `OPFireBulletForShip` (`Ship` &ship, `Board` &board)
- std::pair< int, bool > `OPFindNearestShip` (`Ship` &ship, std::vector< `Ship` > &CurrentShips)
- float `OPDistanceOfShipFromShip` (`Ship` &ship1, `Ship` &ship2)
- float `OPRelativeAngleOfShipFromShip` (`Ship` &ship2, `Ship` &ship1)
- int `OPClosestShipEnemy` (std::vector< `Ship` > &Ships, int NumberShips, `Bullet` &actualmissile, double max-Distance)
- bool `OPShipInArc` (`Ship` &ship, `Bullet` &actualmissile)
- float `OPDistanceOfShipFromMissile` (`Ship` &ship, `Bullet` &actualmissile)
- float `OPRelativeAngleShipToMissilePosition` (`Ship` &ship, `Bullet` &actualmissile)

Variables

- int `POSX`
- int `NEGX`
- int `POSY`
- int `NEGY`

4.33.1 Macro Definition Documentation

4.33.1.1 `#define ALIENMISSILE -1`

4.33.1.2 `#define ANGLEOFVIEW 45`

4.33.1.3 `#define angularvelocity 5`

4.33.1.4 `#define minAngleofRotation 5`

4.33.1.5 `#define minDistanceforRotation 5000000`

4.33.1.6 `#define NOSHIP -1`

4.33.1.7 `#define RIGHTANGLE 90`

4.33.1.8 `#define theta 15`

4.33.2 Function Documentation

4.33.2.1 `int OPClosestShipEnemy (std::vector< Ship > & Ships, int NumberShips, Bullet & actualmissile, double maxDistance)`

4.33.2.2 `float OPDistanceOfShipFromMissile (Ship & ship, Bullet & actualmissile)`

4.33.2.3 `float OPDistanceOfShipFromShip (Ship & ship1, Ship & ship2)`

4.33.2.4 `std::pair<int,bool> OPFindNearestShip (Ship & ship, std::vector< Ship > & CurrentShips)`

4.33.2.5 `void OPFireBulletForShip (Ship & ship, Board & board)`

4.33.2.6 `void OPMoveShipInDirectionOfShip (Ship & ship1, Ship & ship2)`

4.33.2.7 `float OPRelativeAngleOfShipFromShip (Ship & ship2, Ship & ship1)`

4.33.2.8 `float OPRelativeAngleShipFromMissile (Ship & ship, Bullet & actualmissile)`

4.33.2.9 `float OPRelativeAngleShiptoMissilePosition (Ship & ship, Bullet & actualmissile)`

4.33.2.10 `bool OPShipInArc (Ship & ship, Bullet & actualmissile)`

4.33.2.11 `void OPTurnShipInDirectionOfShip (Ship & ship1, Ship & ship2, bool & finished)`

4.33.2.12 `void OPUpdateAIBoard (Board & board)`

4.33.2.13 `void OPUpdateMissile (Board & board)`

4.33.2.14 `void OPUpdatePlayerAI (Board & board)`

4.33.2.15 `void OPUpdateShipMissile (Board & board)`

4.33.2.16 `void OPUpdateShipMissileVelocity (Bullet & actualmissile, Ship & ship2)`

4.33.3 Variable Documentation

4.33.3.1 `int NEGX`

4.33.3.2 `int NEGY`

4.33.3.3 `int POSX`

4.33.3.4 `int POSY`

4.34 OPAIcomputation.cpp File Reference

```
#include "OPAI.h"
```

Functions

- `std::pair< int, bool > OPFindNearestShip (Ship &ship, std::vector< Ship > &CurrentShips)`
- `float OPRelativeAngleShipFromMissile (Ship &ship, Bullet &actualmissile)`
- `float OPDistanceOfShipFromShip (Ship &ship1, Ship &ship2)`
- `float OPRelativeAngleOfShipFromShip (Ship &ship2, Ship &ship1)`
- `int OPClosestShipEnemy (std::vector< Ship > &Ships, int NumberShips, Bullet &actualmissile, double max-Distance)`
- `bool OPShipInArc (Ship &ship, Bullet &actualmissile)`
- `float OPDistanceOfShipFromMissile (Ship &ship, Bullet &actualmissile)`
- `float OPRelativeAngleShiptoMissilePosition (Ship &ship, Bullet &actualmissile)`

4.34.1 Function Documentation

4.34.1.1 `int OPClosestShipEnemy (std::vector< Ship > & Ships, int NumberShips, Bullet & actualmissile, double maxDistance)`

4.34.1.2 `float OPDistanceOfShipFromMissile (Ship & ship, Bullet & actualmissile)`

4.34.1.3 `float OPDistanceOfShipFromShip (Ship & ship1, Ship & ship2)`

4.34.1.4 `std::pair<int,bool> OPFindNearestShip (Ship & ship, std::vector< Ship > & CurrentShips)`

4.34.1.5 `float OPRelativeAngleOfShipFromShip (Ship & ship2, Ship & ship1)`

4.34.1.6 `float OPRelativeAngleShipFromMissile (Ship & ship, Bullet & actualmissile)`

4.34.1.7 `float OPRelativeAngleShiptoMissilePosition (Ship & ship, Bullet & actualmissile)`

4.34.1.8 `bool OPShipInArc (Ship & ship, Bullet & actualmissile)`

4.35 OPAIMissile.cpp File Reference

```
#include "OPAI.h"
```

Functions

- void `OPUpdateShipMissile` (Board &board)
- void `OPUpdateShipMissileVelocity` (Bullet &actualmissile, Ship &ship2)

4.35.1 Function Documentation

4.35.1.1 `void OPUpdateShipMissile (Board & board)`

4.35.1.2 `void OPUpdateShipMissileVelocity (Bullet & actualmissile, Ship & ship2)`

4.36 OPAIPlayer.cpp File Reference

```
#include "OPAI.h"
```

Functions

- void `OPMoveShipInDirectionOfShip` (Ship &ship1, Ship &ship2)
- void `OPTurnShipInDirectionOfShip` (Ship &ship1, Ship &ship2, bool &finished)
- void `OPFireBulletForShip` (Ship &ship, Board &board)

4.36.1 Function Documentation

4.36.1.1 `void OPFireBulletForShip (Ship & ship, Board & board)`

4.36.1.2 `void OPMoveShipInDirectionOfShip (Ship & ship1, Ship & ship2)`

4.36.1.3 void OPTurnShipInDirectionOfShip (Ship & *ship1*, Ship & *ship2*, bool & *finished*)

4.37 OPAIUpdate.cpp File Reference

```
#include "OPAI.h"
```

Functions

- void [OPUpdateAIBoard](#) (Board &board)
- void [OPUpdatePlayerAI](#) (Board &board)
- void [OPUpdateMissile](#) (Board &board)

4.37.1 Function Documentation

4.37.1.1 void [OPUpdateAIBoard](#) (Board & *board*)

4.37.1.2 void [OPUpdateMissile](#) (Board & *board*)

4.37.1.3 void [OPUpdatePlayerAI](#) (Board & *board*)

4.38 OriginalAI.cpp File Reference

```
#include "AI.h"
```

Macros

- #define [theta](#) 45
- #define [minDistanceforRotation](#) 100
- #define [minAngleofRotation](#) 15
- #define [angularvelocity](#) 10
- #define [maximumdistance](#) 100000

Functions

- void [UpdateAIBoard](#) (Board &board)
- void [UpdatePlayerAI](#) (Board &board)
- void [UpdateAlien](#) (Board &board)
- void [UpdateAlienMissile](#) (Board &board)
- void [UpdateShipMissile](#) (Board &board)
- int [ClosestAlienEnemy](#) (std::vector< [Alien](#) > &Aliens, int NumberAliens, [Bullet](#) &actualmissile, double max-Distance)
- bool [InArc](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)
- bool [InArc](#) (Ship &ship, [Bullet](#) &actualmissile)
- float [relativeAngle](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)
- float [relativeAngle](#) (Ship &ship, [Bullet](#) &actualmissile)
- void [UpdateMissile](#) (Board &board)
- void [UpdateVelocity](#) ([Bullet](#) &actualmissile, Ship &ship)
- void [UpdateVelocity](#) ([Bullet](#) &actualmissile, [Alien](#) &alien)
- float [relativeAngletoMissile](#) ([Alien](#) &alien, [Bullet](#) &actualmissile)

- float `relativeAngletoMissile` (`Ship` &`ship`, `Bullet` &`actualmissile`)
- void `MoveInDirectionOf` (`Ship` &`ship`, `Alien` &`alien`)
- void `TurnInDirectionOf` (`Ship` &`ship`, `Alien` &`alien`)
- float `relativeAngle` (`Ship` &`ship`, `Alien` &`alien`)
- void `MoveInDirectionOf` (`Alien` &`alien`, `Ship` &`ship`)
- void `TurnInDirectionOf` (`Alien` &`alien`, `Ship` &`ship`)
- float `relativeAngle` (`Alien` &`alien`, `Ship` &`ship`)
- int `FindNearestAlien` (`Ship` &`ship`, `std::vector`< `Alien` > &`CurrentAliens`, bool `nearEnough`)
- int `FindNearestShip` (`Alien` &`alien`, `std::vector`< `Ship` > &`CurrentShips`, bool `nearEnough`)
- float `Distance` (`Alien` &`alien`, `Bullet` &`actualmissile`)
- float `Distance` (`Ship` &`ship`, `Bullet` &`actualmissile`)
- float `Distance` (`Ship` &`ship`, `Alien` &`alien`)
- int `ClosestShipEnemy` (`std::vector`< `Ship` > &`Ships`, int `NumberShips`, `Bullet` &`actualmissile`)

4.38.1 Macro Definition Documentation

4.38.1.1 `#define angularvelocity 10`

4.38.1.2 `#define maximumdistance 100000`

4.38.1.3 `#define minAngleofRotation 15`

4.38.1.4 `#define minDistanceforRotation 100`

4.38.1.5 `#define theta 45`

4.38.2 Function Documentation

4.38.2.1 int `ClosestAlienEnemy` (`std::vector`< `Alien` > &`Aliens`, int `NumberAliens`, `Bullet` & `actualmissile`, double `maxDistance`)

4.38.2.2 int `ClosestShipEnemy` (`std::vector`< `Ship` > &`Ships`, int `NumberShips`, `Bullet` & `actualmissile`)

4.38.2.3 float `Distance` (`Alien` & `alien`, `Bullet` & `actualmissile`)

4.38.2.4 float `Distance` (`Ship` & `ship`, `Bullet` & `actualmissile`)

4.38.2.5 float `Distance` (`Ship` & `ship`, `Alien` & `alien`)

4.38.2.6 int `FindNearestAlien` (`Ship` & `ship`, `std::vector`< `Alien` > & `CurrentAliens`, bool `nearEnough`)

4.38.2.7 int `FindNearestShip` (`Alien` & `alien`, `std::vector`< `Ship` > & `CurrentShips`, bool `nearEnough`)

4.38.2.8 bool `InArc` (`Alien` & `alien`, `Bullet` & `actualmissile`)

4.38.2.9 bool `InArc` (`Ship` & `ship`, `Bullet` & `actualmissile`)

4.38.2.10 void `MoveInDirectionOf` (`Ship` & `ship`, `Alien` & `alien`)

4.38.2.11 void `MoveInDirectionOf` (`Alien` & `alien`, `Ship` & `ship`)

4.38.2.12 float `relativeAngle` (`Alien` & `alien`, `Bullet` & `actualmissile`)

4.38.2.13 float `relativeAngle` (`Ship` & `ship`, `Bullet` & `actualmissile`)

- 4.38.2.14 float relativeAngle (Ship & *ship*, Alien & *alien*)
- 4.38.2.15 float relativeAngle (Alien & *alien*, Ship & *ship*)
- 4.38.2.16 float relativeAngletoMissile (Alien & *alien*, Bullet & *actualmissile*)
- 4.38.2.17 float relativeAngletoMissile (Ship & *ship*, Bullet & *actualmissile*)
- 4.38.2.18 void TurnInDirectionOf (Ship & *ship*, Alien & *alien*)
- 4.38.2.19 void TurnInDirectionOf (Alien & *alien*, Ship & *ship*)
- 4.38.2.20 void UpdateAIBoard (Board & *board*)
- 4.38.2.21 void UpdateAlien (Board & *board*)
- 4.38.2.22 void UpdateAlienMissile (Board & *board*)
- 4.38.2.23 void UpdateMissile (Board & *board*)
- 4.38.2.24 void UpdatePlayerAI (Board & *board*)
- 4.38.2.25 void UpdateShipMissile (Board & *board*)
- 4.38.2.26 void UpdateVelocity (Bullet & *actualmissile*, Ship & *ship*)
- 4.38.2.27 void UpdateVelocity (Bullet & *actualmissile*, Alien & *alien*)

4.39 port.h File Reference

Macros

- #define [SERVICE_PORT](#) 5455 /* hard-coded port number */

4.39.1 Macro Definition Documentation

- 4.39.1.1 #define [SERVICE_PORT](#) 5455 /* hard-coded port number */

4.40 Ship.cpp File Reference

```
#include "Ship.h"
```

4.41 Ship.h File Reference

```
#include "Color.h"
#include <string>
```

Classes

- class [Ship](#)

4.42 ShipTest.cpp File Reference

```
#include <iostream>
#include <algorithm>
#include "ShipTest.h"
```

Functions

- bool [RunAllShipTests](#) ()
- bool [ShipInitialisationTests](#) ()
- bool [SettingShipTests](#) ()
- bool [UpdateShipTests](#) ()

4.42.1 Function Documentation

4.42.1.1 bool [RunAllShipTests](#) ()

4.42.1.2 bool [SettingShipTests](#) ()

4.42.1.3 bool [ShipInitialisationTests](#) ()

4.42.1.4 bool [UpdateShipTests](#) ()

4.43 ShipTest.h File Reference

```
#include "Ship.h"
#include "Test.h"
```

Functions

- bool [RunAllShipTests](#) ()
- bool [ShipInitialisationTests](#) ()
- bool [SettingShipTests](#) ()
- bool [UpdateShipTests](#) ()

4.43.1 Function Documentation

4.43.1.1 bool [RunAllShipTests](#) ()

4.43.1.2 bool [SettingShipTests](#) ()

4.43.1.3 bool [ShipInitialisationTests](#) ()

4.43.1.4 bool [UpdateShipTests](#) ()

4.44 Test.cpp File Reference

```
#include <iostream>
#include "Test.h"
```

4.45 Test.h File Reference

```
#include <string>
```

Classes

- class [Test](#)

4.46 testmera.cpp File Reference

```
#include <iostream>
#include <fstream>
#include <vector>
#include <string>
#include <cstdio>
#include <algorithm>
```

Classes

- struct [IDScore](#)
- struct [sortclass](#)

Functions

- void [UpdateHighScores](#) ()
- int [main](#) ()

Variables

- struct [sortclass](#) [sortobject](#)

4.46.1 Function Documentation

4.46.1.1 [int main \(\)](#)

4.46.1.2 [void UpdateHighScores \(\)](#)

4.46.2 Variable Documentation

4.46.2.1 [struct sortclass sortobject](#)

4.47 udp.cpp File Reference

```
#include "udp.h"
```

Classes

- struct [IPMessage](#)

Functions

- std::string [GetIP](#) ()
- bool [IsBaap](#) ()
- std::string [ToStr](#) (char *arr)
- int [GetNumPlayers](#) ()
- void [AddPlayers](#) (char players[])
- int [LengthNum](#) (long long num)
- int [FindIndex](#) (long long ip)
- void * [SendMessage](#) (void *id)
- char * [ToArr](#) (std::string str)
- void [SendMessageToAll](#) (std::string message)
- void * [RemovePlayer](#) (void *input)
- void * [OutMessage](#) (void *input)
- void * [ReceiveData](#) (void *input)
- int [networkmain](#) (int argc, char **argv)

Variables

- std::vector< std::pair< long long, long long > > [IPdata](#)
- std::vector< long long > [TimeStamp](#)
- std::queue< std::string > [Instructions](#)
- bool [First](#) =true
- bool [Connect](#)
- bool [playersReady](#)
- bool [isOffline](#)
- bool [noIP](#)
- std::string [ipadr](#)
- int [sid](#)
- int [LastTime](#)

4.47.1 Function Documentation

4.47.1.1 void [AddPlayers](#) (char *players*[])

4.47.1.2 int [FindIndex](#) (long long *ip*)

4.47.1.3 std::string [GetIP](#) ()

4.47.1.4 int [GetNumPlayers](#) ()

4.47.1.5 bool [IsBaap](#) ()

4.47.1.6 int [LengthNum](#) (long long *num*)

4.47.1.7 int [networkmain](#) (int *argc*, char ** *argv*)

4.47.1.8 void* [OutMessage](#) (void * *input*)

4.47.1.9 void* ReceiveData (void * *input*)

4.47.1.10 void* RemovePlayer (void * *input*)

4.47.1.11 void* SendMessage (void * *id*)

4.47.1.12 void SendMessageToAll (std::string *message*)

4.47.1.13 char* ToArr (std::string *str*)

4.47.1.14 std::string ToStr (char * *arr*)

4.47.2 Variable Documentation

4.47.2.1 bool Connect

4.47.2.2 bool First =true

4.47.2.3 std::queue<std::string> Instructions

4.47.2.4 std::string ipadr

4.47.2.5 std::vector< std::pair<long long,long long> > IPdata

4.47.2.6 bool isOffline

4.47.2.7 int LastTime

4.47.2.8 bool noIP

4.47.2.9 bool playersReady

4.47.2.10 int sid

4.47.2.11 std::vector<long long> TimeStamp

4.48 udp.h File Reference

```
#include <stdlib.h>
#include <stdio.h>
#include <string.h>
#include <netdb.h>
#include <sys/socket.h>
#include "port.h"
#include <unistd.h>
#include <netinet/in.h>
#include <arpa/inet.h>
#include <iostream>
#include <fstream>
#include <vector>
#include <pthread.h>
#include <math.h>
#include <algorithm>
#include <queue>
```


Macros

- `#define BUFSIZE 50000`

Functions

- `std::string GetIP ()`
- `bool IsBaap ()`
- `std::string ToStr (char *arr)`
- `int GetNumPlayers ()`
- `void AddPlayers (char players[])`
- `int LengthNum (long long num)`
- `int FindIndex (long long ip)`
- `void * SendMessage (void *id)`
- `char * ToArr (std::string str)`
- `void SendMessageToAll (std::string message)`
- `void * RemovePlayer (void *input)`
- `void * OutMessage (void *input)`
- `int networkmain (int argc, char **argv)`

4.48.1 Macro Definition Documentation

4.48.1.1 `#define BUFSIZE 50000`

4.48.2 Function Documentation

4.48.2.1 `void AddPlayers (char players[])`

4.48.2.2 `int FindIndex (long long ip)`

4.48.2.3 `std::string GetIP ()`

4.48.2.4 `int GetNumPlayers ()`

4.48.2.5 `bool IsBaap ()`

4.48.2.6 `int LengthNum (long long num)`

4.48.2.7 `int networkmain (int argc, char ** argv)`

4.48.2.8 `void* OutMessage (void * input)`

4.48.2.9 `void* RemovePlayer (void * input)`

4.48.2.10 `void* SendMessage (void * id)`

4.48.2.11 `void SendMessageToAll (std::string message)`

4.48.2.12 `char* ToArr (std::string str)`

4.48.2.13 `std::string ToStr (char * arr)`

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