Tetris2D

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 3

File Index

3.1 File List

Here is a list of all files with brief descriptions:

Chapter 4

Class Documentation

4.1 Eight Class Reference

`#include <Font.hpp>`

Public Member Functions

- Eight ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.1.1 Constructor & Destructor Documentation

4.1.1.1 Eight()

`Eight::Eight ( )`

4.1.2 Member Data Documentation

4.1.2.1 g_texture_buffer_data

`std::vector< GLfloat > Eight::g_texture_buffer_data [static]`

4.1.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Eight::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.2 Five Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Five ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.2.1 Constructor & Destructor Documentation

4.2.1.1 Five()

```
Five::Five ( )
```

4.2.2 Member Data Documentation

4.2.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Five::g_texture_buffer_data  [static]
```

4.2.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Five::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.3 Four Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Four ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.3.1 Constructor & Destructor Documentation

4.3.1.1 Four()

```
Four::Four ( )
```

4.3.2 Member Data Documentation

4.3.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Four::g_texture_buffer_data  [static]
```

Initial value:

```
= {

        0.51f,  1.0f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,  0.76f,

        0.51f,  1.0f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,  0.76f,

        0.51f,  1.0f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,  0.76f,
}
```

4.3.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Four::g_vertex_buffer_data  [static]
```

Initial value:

```
= {

        0.0f, 0.7f, 0.0f,
        1.0f, 0.7f, 0.0f,
        0.0f, 0.9f, 0.0f,
        1.0f, 0.7f, 0.0f,
        0.0f, 0.9f, 0.0f,
        1.0f, 0.9f, 0.0f,

        0.0f, 0.7f, 0.0f,
        0.2f, 0.7f, 0.0f,
        0.0f, 1.6f, 0.0f,
        0.2f, 0.7f, 0.0f,
        0.0f, 1.6f, 0.0f,
        0.2f, 1.6f, 0.0f,

        0.8f, 0.0f, 0.0f,
        1.0f, 0.0f, 0.0f,
        0.8f, 1.6f, 0.0f,
        1.0f, 0.0f, 0.0f,
        0.8f, 1.6f, 0.0f,
        1.0f, 1.6f, 0.0f,
}
```

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

- headers/Font.hpp
- Font.cpp

4.4 GeradorPecas Class Reference

```
#include <GeradorPecas.hpp>
```

Public Member Functions

- GeradorPecas ()
- GeradorPecas (int, int, int, int, int **, int)
- void criaPecaZ (int **, int)
- void criaPecaT (int **, int)
- void criaPecaJ (int **, int)
- void criaPecaS (int **, int)
- void criaPecaO (int **, int)
- void criaPecaL (int **, int)
- void criaPecaI (int **, int)
- Peca & getPecaZ ()
- Peca & getPecaT ()
- Peca & getPecaJ ()
- Peca & getPecaS ()
- Peca & getPecaO ()
- Peca & getPecaL ()
- Peca & getPecaI ()

4.4.1 Constructor & Destructor Documentation

4.4.1.1 GeradorPecas() [1/2]

```
GeradorPecas::GeradorPecas ( )
```

4.4.1.2 GeradorPecas() [2/2]

```
GeradorPecas::GeradorPecas (
            int xPosInicial,
            int yPosInicial,
            int iHeight,
            int iWidth,
            int ** gameGrid,
            int iGameLevel )
```

4.4.2 Member Function Documentation

4.4.2.1 criaPecaI()

```
void GeradorPecas::criaPecaI (
            int ** gameGrid,
            int iGameLevel )
```

4.4.2.2 criaPecaJ()

```
void GeradorPecas::criaPecaJ (
            int ** gameGrid,
            int iGameLevel )
```

4.4.2.3 criaPecaL()

```
void GeradorPecas::criaPecaL (
            int ** gameGrid,
            int iGameLevel )
```

4.4.2.4 criaPecaO()

```
void GeradorPecas::criaPecaO (
            int ** gameGrid,
            int iGameLevel )
```

4.4.2.5 criaPecaS()

```
void GeradorPecas::criaPecaS (
            int ** gameGrid,
            int iGameLevel )
```

4.4.2.6 criaPecaT()

```
void GeradorPecas::criaPecaT (
            int ** gameGrid,
            int iGameLevel )
```

4.4.2.7 criaPecaZ()

```
void GeradorPecas::criaPecaZ (
            int ** gameGrid,
            int iGameLevel )
```

4.4.2.8 getPecaI()

```
Peca & GeradorPecas::getPecaI ( )
```

4.4.2.9 getPecaJ()

```
Peca & GeradorPecas::getPecaJ ( )
```

4.4.2.10 getPecaL()

```
Peca & GeradorPecas::getPecaL ( )
```

4.4.2.11 getPecaO()

```
Peca & GeradorPecas::getPecaO ( )
```

4.4.2.12 getPecaS()

```
Peca & GeradorPecas::getPecaS ( )
```

4.4.2.13 getPecaT()

```
Peca & GeradorPecas::getPecaT ( )
```

4.4.2.14 getPecaZ()

```
Peca & GeradorPecas::getPecaZ ( )
```

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

- headers/GeradorPecas.hpp
- GeradorPecas.cpp

4.5 Hold Class Reference

`#include <Font.hpp>`

Public Member Functions

- Hold ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.5.1 Constructor & Destructor Documentation

4.5.1.1 Hold()

`Hold::Hold ( )`

4.5.2 Member Data Documentation

4.5.2.1 g_texture_buffer_data

`std::vector< GLfloat > Hold::g_texture_buffer_data [static]`

4.5.2.2 g_vertex_buffer_data

`std::vector< GLfloat > Hold::g_vertex_buffer_data [static]`

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

- headers/Font.hpp
- Font.cpp

4.6 Level Class Reference

`#include <Font.hpp>`

Public Member Functions

- Level ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.6.1 Constructor & Destructor Documentation

4.6.1.1 Level()

```
Level::Level ( )
```

4.6.2 Member Data Documentation

4.6.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Level::g_texture_buffer_data  [static]
```

4.6.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Level::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.7 Lines Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Lines ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.7.1 Constructor & Destructor Documentation

4.7.1.1 Lines()

```
Lines::Lines ( )
```

4.7.2 Member Data Documentation

4.7.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Lines::g_texture_buffer_data  [static]
```

4.7.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Lines::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.8 Next Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Next ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.8.1 Constructor & Destructor Documentation

4.8.1.1 Next()

```
Next::Next ( )
```

4.8.2 Member Data Documentation

4.8.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Next::g_texture_buffer_data  [static]
```

4.8.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Next::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.9 Nine Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Nine ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.9.1 Constructor & Destructor Documentation

4.9.1.1 Nine()

```
Nine::Nine ( )
```

4.9.2 Member Data Documentation

4.9.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Nine::g_texture_buffer_data  [static]
```

4.9.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Nine::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.10 One Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- One ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.10.1 Constructor & Destructor Documentation

4.10.1.1 One()

```
One::One ( )
```

4.10.2 Member Data Documentation

4.10.2.1 g_texture_buffer_data

```
std::vector< GLfloat > One::g_texture_buffer_data  [static]
```

Initial value:

```
= {

        0.51f,  1.0f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,  0.76f,
}
```

4.10.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > One::g_vertex_buffer_data  [static]
```

Initial value:

```
= {

        0.8f, 0.0f, 0.0f,
        1.0f, 0.0f, 0.0f,
        0.8f, 1.6f, 0.0f,
        1.0f, 0.0f, 0.0f,
        0.8f, 1.6f, 0.0f,
        1.0f, 1.6f, 0.0f,
}
```

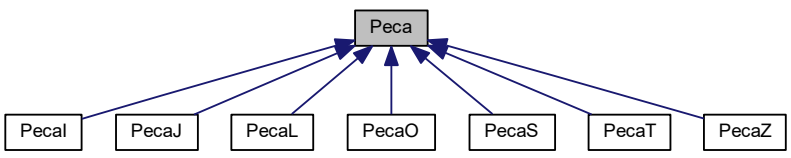
The documentation for this class was generated from the following files:

- headers/Font.hpp
- Font.cpp

4.11 Peca Class Reference

```
#include <Peca.hpp>
```

Inheritance diagram for Peca:



Public Member Functions

- Peca ()
- virtual ~Peca ()
- virtual void preencheRealVertex (GLfloat, GLfloat)=0
- virtual void modificaQuadricula (GLfloat, GLfloat)=0
- virtual void realVertexBuffer ()=0
- virtual bool atualizaMatriz ()=0
- virtual bool avaliaColisao ()=0
- virtual void atualizaPos ()=0
- virtual void rotacaoPeca (glm::mat4 &rot)=0
- virtual void translacaoPeca (glm::mat4 &trans, bool)=0
- virtual void translacaoPecaContorno (glm::mat4 &trans)=0
- virtual int dropAccordingToLevel (double)=0
- virtual int collisionYPos ()=0
- virtual int ** getGameGrid ()=0
- virtual int getNumberRotate ()=0
- virtual int getNumberTranslation ()=0
- virtual int getNumberDown ()=0
- virtual int getXPosD ()=0
- virtual int getXPosE ()=0
- virtual bool hasCollidedBottom ()=0
- virtual bool hasCollidedLeft ()=0
- virtual bool hasCollidedRight ()=0
- virtual bool rotationAllowed ()=0
- virtual void incNumberRotate ()=0
- virtual void incNumberTranslation ()=0
- virtual void decNumberTranslation ()=0
- virtual void incNumberDown ()=0
- virtual void drawObject ()=0

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data
- static std::vector< GLfloat > g_real_vertex_buffer

4.11.1 Constructor & Destructor Documentation

4.11.1.1 Peca()

```
Peca::Peca ( )  [inline]
```

4.11.1.2 ~Peca()

```
virtual Peca::~Peca ( )  [inline], [virtual]
```

4.11.2 Member Function Documentation

4.11.2.1 atualizaMatriz()

```
virtual bool Peca::atualizaMatriz ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaO, and PecaT.

4.11.2.2 atualizaPos()

```
virtual void Peca::atualizaPos ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.3 avaliaColisao()

```
virtual bool Peca::avaliaColisao ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaJ, PecaL, PecaT, PecaZ, and PecaO.

4.11.2.4 collisionYPos()

```
virtual int Peca::collisionYPos ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.5 decNumberTranslation()

```
virtual void Peca::decNumberTranslation ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.6 drawObject()

```
virtual void Peca::drawObject ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.7 dropAccordingToLevel()

```
virtual int Peca::dropAccordingToLevel (
            double  )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.8 getGameGrid()

```
virtual int** Peca::getGameGrid ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.9 getNumberDown()

```
virtual int Peca::getNumberDown ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.10 getNumberRotate()

```
virtual int Peca::getNumberRotate ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.11 getNumberTranslation()

```
virtual int Peca::getNumberTranslation ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.12 getXPosD()

```
virtual int Peca::getXPosD ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.13 getXPosE()

```
virtual int Peca::getXPosE ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.14 hasCollidedBottom()

```
virtual bool Peca::hasCollidedBottom ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.15 hasCollidedLeft()

```
virtual bool Peca::hasCollidedLeft ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.16 hasCollidedRight()

```
virtual bool Peca::hasCollidedRight ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.17 incNumberDown()

```
virtual void Peca::incNumberDown ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.18 incNumberRotate()

```
virtual void Peca::incNumberRotate ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.19 incNumberTranslation()

```
virtual void Peca::incNumberTranslation ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.20 modificaQuadricula()

```
virtual void Peca::modificaQuadricula (
            GLfloat ,
            GLfloat  )  [pure virtual]
```

Implemented in PecaI, PecaJ, PecaL, PecaO, PecaS, PecaT, and PecaZ.

4.11.2.21 preencheRealVertex()

```
virtual void Peca::preencheRealVertex (
            GLfloat ,
            GLfloat  )  [pure virtual]
```

Implemented in PecaI, PecaJ, PecaL, PecaO, PecaS, PecaT, and PecaZ.

4.11.2.22 realVertexBuffer()

```
virtual void Peca::realVertexBuffer ( )  [pure virtual]
```

Implemented in PecaI, PecaJ, PecaL, PecaO, PecaS, PecaT, and PecaZ.

4.11.2.23 rotacaoPeca()

```
virtual void Peca::rotacaoPeca (
            glm::mat4 & rot )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.24 rotationAllowed()

```
virtual bool Peca::rotationAllowed ( )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.25 translacaoPeca()

```
virtual void Peca::translacaoPeca (
            glm::mat4 & trans,
            bool  )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.2.26 translacaoPecaContorno()

```
virtual void Peca::translacaoPecaContorno (
            glm::mat4 & trans )  [pure virtual]
```

Implemented in PecaI, PecaS, PecaZ, PecaJ, PecaL, PecaT, and PecaO.

4.11.3 Member Data Documentation

4.11.3.1 g_real_vertex_buffer

```
std::vector<GLfloat> Peca::g_real_vertex_buffer  [static]
```

4.11.3.2 g_texture_buffer_data

```
std::vector<GLfloat> Peca::g_texture_buffer_data  [static]
```

4.11.3.3 g_vertex_buffer_data

```
std::vector<GLfloat> Peca::g_vertex_buffer_data  [static]
```

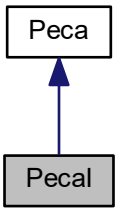
The documentation for this class was generated from the following file:

- headers/Peca.hpp

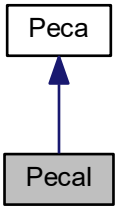
4.12 Pecal Class Reference

`#include <PecaI.hpp>`

Inheritance diagram for PecaI:



Collaboration diagram for PecaI:



Public Member Functions

- Pecal ()
- Pecal (int, int, int, int, int $**$, int)
- void preencheRealVertex (GLfloat, GLfloat)
- void modificaQuadricula (GLfloat, GLfloat)

  Modificacao de um bloco/quadricula da peca, representado por 2 triangulos.
- void realVertexBuffer ()
- bool preencheMatriz (int, int)
- bool atualizaMatriz ()
- bool avaliaPotencialRotacao (int, int, int, int, int)
- bool avaliaColisao ()
- void atualizaPos ()
- void rotacaoPeca (glm::mat4 &rot)

  glm::mat4& rot => alternativa a glm::mat4 $*$rot aqui, com chamada de funcao &rot, ao inves de rot
- void translacaoPeca (glm::mat4 &trans, bool)

- int collisionYPos ()
- void translacaoPecaContorno (glm::mat4 &trans)
- int dropAccordingToLevel (double)

  Modificar o valor de tempo de acordo com o nivel de jogo.
- int ** getGameGrid ()
- int getNumberRotate ()
- int getNumberTranslation ()
- int getNumberDown ()
- int getXPosD ()
- int getXPosE ()
- bool hasCollidedBottom ()
- bool hasCollidedLeft ()
- bool hasCollidedRight ()
- bool rotationAllowed ()
- void incNumberRotate ()
- void incNumberTranslation ()
- void decNumberTranslation ()
- void incNumberDown ()
- void drawObject ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data

  Desenho da peca.
- static std::vector< GLfloat > g_texture_buffer_data

  Textura da peca.
- static std::vector< GLfloat > g_real_vertex_buffer = {}
- static std::vector< GLfloat > g_vertex_buffer_dataPos
- static std::vector< GLfloat > g_texture_buffer_dataPos

  Textura da posicao de colisao da peca.

4.12.1 Constructor & Destructor Documentation

4.12.1.1 Pecal() [1/2]

```
PecaI::PecaI ( )
```

4.12.1.2 Pecal() [2/2]

```
PecaI::PecaI (
            int xPosInicial,
            int yPosInicial,
            int iHeight,
            int iWidth,
            int ** gameGrid,
            int iGameLevel )
```

4.12.2 Member Function Documentation

4.12.2.1 atualizaMatriz()

```
bool PecaI::atualizaMatriz ( )  [virtual]
```

Implements Peca.

4.12.2.2 atualizaPos()

```
void PecaI::atualizaPos ( )  [virtual]
```

Implements Peca.

4.12.2.3 avaliaColisao()

```
bool PecaI::avaliaColisao ( )  [virtual]
```

Implements Peca.

4.12.2.4 avaliaPotencialRotacao()

```
bool PecaI::avaliaPotencialRotacao (
            int x,
            int y,
            int iPieceHeight,
            int xPosE,
            int xPosD )
```

4.12.2.5 collisionYPos()

```
int PecaI::collisionYPos ( )  [virtual]
```

Implements Peca.

4.12.2.6 decNumberTranslation()

```
void PecaI::decNumberTranslation ( )  [virtual]
```

Implements Peca.

4.12.2.7 drawObject()

```
void PecaI::drawObject ( )  [virtual]
```

Implements Peca.

4.12.2.8 dropAccordingToLevel()

```
int PecaI::dropAccordingToLevel (
            double x )  [virtual]
```

Modificar o valor de tempo de acordo com o nivel de jogo.

Implements Peca.

4.12.2.9 getGameGrid()

```
int ** PecaI::getGameGrid ( )  [virtual]
```

Implements Peca.

4.12.2.10 getNumberDown()

```
int PecaI::getNumberDown ( )  [virtual]
```

Implements Peca.

4.12.2.11 getNumberRotate()

```
int PecaI::getNumberRotate ( )  [virtual]
```

Implements Peca.

4.12.2.12 getNumberTranslation()

```
int PecaI::getNumberTranslation ( )  [virtual]
```

Implements Peca.

4.12.2.13 getXPosD()

```
int PecaI::getXPosD ( )  [virtual]
```

Implements Peca.

4.12.2.14 getXPosE()

```
int PecaI::getXPosE ( )  [virtual]
```

Implements Peca.

4.12.2.15 hasCollidedBottom()

```
bool PecaI::hasCollidedBottom ( )  [virtual]
```

Implements Peca.

4.12.2.16 hasCollidedLeft()

```
bool PecaI::hasCollidedLeft ( )  [virtual]
```

Implements Peca.

4.12.2.17 hasCollidedRight()

```
bool PecaI::hasCollidedRight ( )  [virtual]
```

Implements Peca.

4.12.2.18 incNumberDown()

```
void PecaI::incNumberDown ( )  [virtual]
```

Implements Peca.

4.12.2.19 incNumberRotate()

```
void PecaI::incNumberRotate ( )  [virtual]
```

Implements Peca.

4.12.2.20 incNumberTranslation()

```
void PecaI::incNumberTranslation ( )  [virtual]
```

Implements Peca.

4.12.2.21 modificaQuadricula()

```
void PecaI::modificaQuadricula (
            GLfloat x,
            GLfloat y )  [virtual]
```

Modificacao de um bloco/quadricula da peca, representado por 2 triangulos.

Implements Peca.

4.12.2.22 preencheMatriz()

```
bool PecaI::preencheMatriz (
            int x,
            int y )
```

4.12.2.23 preencheRealVertex()

```
void PecaI::preencheRealVertex (
            GLfloat x,
            GLfloat y )  [virtual]
```

Preenchimento do vertexBuffer de acordo com rotacao da peca e local de colisao, para armazenamento do vertex↩ Buffer das pecas ja jogadas (em Projeto.cpp)

Implements Peca.

4.12.2.24 realVertexBuffer()

```
void PecaI::realVertexBuffer ( )  [virtual]
```

Peca quando desenhada esta na origem. A colisao de peca, promove a invocacao deste metodo que tratara de representar a peca, sob a forma de vertexBuffer, tendo em conta local onde esta colidiu e a rotacao da peca.

Implements Peca.

4.12.2.25 rotacaoPeca()

```
void PecaI::rotacaoPeca (
            glm::mat4 & rot )  [virtual]
```

glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot

Implements Peca.

4.12.2.26 rotationAllowed()

```
bool PecaI::rotationAllowed ( )  [virtual]
```

Implements Peca.

4.12.2.27 translacaoPeca()

```
void PecaI::translacaoPeca (
            glm::mat4 & trans,
            bool bPause )  [virtual]
```

Implements Peca.

4.12.2.28 translacaoPecaContorno()

```
void PecaI::translacaoPecaContorno (
            glm::mat4 & trans )  [virtual]
```

Implements Peca.

4.12.3 Member Data Documentation

4.12.3.1 g_real_vertex_buffer

```
std::vector< GLfloat > PecaI::g_real_vertex_buffer = {}  [static]
```

4.12.3.2 g_texture_buffer_data

```
std::vector< GLfloat > PecaI::g_texture_buffer_data  [static]
```

Textura da peca.

4.12.3.3 g_texture_buffer_dataPos

```
std::vector< GLfloat > PecaI::g_texture_buffer_dataPos  [static]
```

Textura da posicao de colisao da peca.

4.12.3.4 g_vertex_buffer_data

```
std::vector< GLfloat > PecaI::g_vertex_buffer_data  [static]
```

Desenho da peca.

4.12.3.5 g_vertex_buffer_dataPos

```
std::vector<GLfloat> PecaI::g_vertex_buffer_dataPos  [static]
```

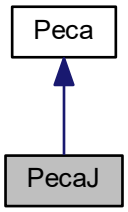
The documentation for this class was generated from the following files:

- headers/PecaI.hpp
- PecaI.cpp

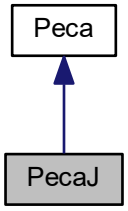
4.13 PecaJ Class Reference

`#include <PecaJ.hpp>`

Inheritance diagram for PecaJ:



Collaboration diagram for PecaJ:



Public Member Functions

- PecaJ ()
- PecaJ (int, int, int, int, int $**$, int)
- void preencheRealVertex (GLfloat, GLfloat)
- void modificaQuadricula (GLfloat, GLfloat)

  Modificacao de um bloco/quadricula da peca, repesentado por 2 triangulos.
- void realVertexBuffer ()
- bool preencheMatriz (int, int, int, int)
- bool atualizaMatriz ()
- bool avaliaPotencialRotacao (int, int, int, int, int, int, int)
- bool avaliaColisao ()
- void atualizaPos ()
- void rotacaoPeca (glm::mat4 &rot)

  glm::mat4& rot => alternativa a glm::mat4 $*$rot aqui, com chamada de funcao &rot, ao inves de rot
- void translacaoPeca (glm::mat4 &trans, bool)

- int collisionYPos ()
- void translacaoPecaContorno (glm::mat4 &trans)
- int dropAccordingToLevel (double)

  Modificar o valor de tempo de acordo com o nivel de jogo.
- int ** getGameGrid ()
- int getNumberRotate ()
- int getNumberTranslation ()
- int getNumberDown ()
- int getXPosD ()
- int getXPosE ()
- bool hasCollidedBottom ()
- bool hasCollidedLeft ()
- bool hasCollidedRight ()
- bool rotationAllowed ()
- void incNumberRotate ()
- void incNumberTranslation ()
- void decNumberTranslation ()
- void incNumberDown ()
- void drawObject ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data

  Desenho da peca.
- static std::vector< GLfloat > g_texture_buffer_data

  Textura da peca.
- static std::vector< GLfloat > g_real_vertex_buffer = {}
- static std::vector< GLfloat > g_vertex_buffer_dataPos
- static std::vector< GLfloat > g_texture_buffer_dataPos

  Textura da posicao de colisao da peca.

4.13.1 Constructor & Destructor Documentation

4.13.1.1 PecaJ() [1/2]

```
PecaJ::PecaJ ( )
```

4.13.1.2 PecaJ() [2/2]

```
PecaJ::PecaJ (
            int xPosInicial,
            int yPosInicial,
            int iHeight,
            int iWidth,
            int ** gameGrid,
            int iGameLevel )
```

4.13.2 Member Function Documentation

4.13.2.1 atualizaMatriz()

```
bool PecaJ::atualizaMatriz ( )  [virtual]
```

Implements Peca.

4.13.2.2 atualizaPos()

```
void PecaJ::atualizaPos ( )  [virtual]
```

Implements Peca.

4.13.2.3 avaliaColisao()

```
bool PecaJ::avaliaColisao ( )  [virtual]
```

Implements Peca.

4.13.2.4 avaliaPotencialRotacao()

```
bool PecaJ::avaliaPotencialRotacao (
            int x,
            int y,
            int xAjuste,
            int yAjuste,
            int iPieceHeight,
            int xPosE,
            int xPosD )
```

4.13.2.5 collisionYPos()

```
int PecaJ::collisionYPos ( )  [virtual]
```

Implements Peca.

4.13.2.6 decNumberTranslation()

```
void PecaJ::decNumberTranslation ( )  [virtual]
```

Implements Peca.

4.13.2.7 drawObject()

```
void PecaJ::drawObject ( )  [virtual]
```

Implements Peca.

4.13.2.8 dropAccordingToLevel()

```
int PecaJ::dropAccordingToLevel (
            double x )  [virtual]
```

Modificar o valor de tempo de acordo com o nivel de jogo.

Implements Peca.

4.13.2.9 getGameGrid()

```
int ** PecaJ::getGameGrid ( )  [virtual]
```

Implements Peca.

4.13.2.10 getNumberDown()

```
int PecaJ::getNumberDown ( )  [virtual]
```

Implements Peca.

4.13.2.11 getNumberRotate()

```
int PecaJ::getNumberRotate ( )  [virtual]
```

Implements Peca.

4.13.2.12 getNumberTranslation()

```
int PecaJ::getNumberTranslation ( )  [virtual]
```

Implements Peca.

4.13.2.13 getXPosD()

```
int PecaJ::getXPosD ( )  [virtual]
```

Implements Peca.

4.13.2.14 getXPosE()

```
int PecaJ::getXPosE ( )  [virtual]
```

Implements Peca.

4.13.2.15 hasCollidedBottom()

```
bool PecaJ::hasCollidedBottom ( )  [virtual]
```

Implements Peca.

4.13.2.16 hasCollidedLeft()

```
bool PecaJ::hasCollidedLeft ( )  [virtual]
```

Implements Peca.

4.13.2.17 hasCollidedRight()

```
bool PecaJ::hasCollidedRight ( )  [virtual]
```

Implements Peca.

4.13.2.18 incNumberDown()

```
void PecaJ::incNumberDown ( )  [virtual]
```

Implements Peca.

4.13.2.19 incNumberRotate()

```
void PecaJ::incNumberRotate ( )  [virtual]
```

Implements Peca.

4.13.2.20 incNumberTranslation()

```
void PecaJ::incNumberTranslation ( )  [virtual]
```

Implements Peca.

4.13.2.21 modificaQuadricula()

```
void PecaJ::modificaQuadricula (
            GLfloat x,
            GLfloat y )  [virtual]
```

Modificacao de um bloco/quadricula da peca, repesentado por 2 triangulos.

Implements Peca.

4.13.2.22 preencheMatriz()

```
bool PecaJ::preencheMatriz (
            int x,
            int y,
            int xAjuste,
            int yAjuste )
```

4.13.2.23 preencheRealVertex()

```
void PecaJ::preencheRealVertex (
            GLfloat x,
            GLfloat y )  [virtual]
```

Preenchimento do vertexBuffer de acordo com rotacao da peca e local de colisao, para armazenamento do vertex↩ Buffer das pecas ja jogadas (em Projeto.cpp)

Implements Peca.

4.13.2.24 realVertexBuffer()

```
void PecaJ::realVertexBuffer ( )  [virtual]
```

Peca quando desenhada esta na origem. A colisao de peca, promove a invocacao deste metodo que tratara de representar a peca, sob a forma de vertexBuffer, tendo em conta local onde esta colidiu e a rotacao da peca.

Implements Peca.

4.13.2.25 rotacaoPeca()

```
void PecaJ::rotacaoPeca (
            glm::mat4 & rot )  [virtual]
```

glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot

Implements Peca.

4.13.2.26 rotationAllowed()

```
bool PecaJ::rotationAllowed ( )  [virtual]
```

Implements Peca.

4.13.2.27 translacaoPeca()

```
void PecaJ::translacaoPeca (
            glm::mat4 & trans,
            bool bPause )  [virtual]
```

Implements Peca.

4.13.2.28 translacaoPecaContorno()

```
void PecaJ::translacaoPecaContorno (
            glm::mat4 & trans )  [virtual]
```

Implements Peca.

4.13.3 Member Data Documentation

4.13.3.1 g_real_vertex_buffer

```
std::vector< GLfloat > PecaJ::g_real_vertex_buffer = {}  [static]
```

4.13.3.2 g_texture_buffer_data

```
std::vector< GLfloat > PecaJ::g_texture_buffer_data  [static]
```

Textura da peca.

4.13.3.3 g_texture_buffer_dataPos

```
std::vector< GLfloat > PecaJ::g_texture_buffer_dataPos  [static]
```

Textura da posicao de colisao da peca.

4.13.3.4 g_vertex_buffer_data

```
std::vector< GLfloat > PecaJ::g_vertex_buffer_data  [static]
```

Desenho da peca.

4.13.3.5 g_vertex_buffer_dataPos

```
std::vector<GLfloat> PecaJ::g_vertex_buffer_dataPos  [static]
```

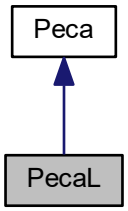
The documentation for this class was generated from the following files:

- headers/PecaJ.hpp
- PecaJ.cpp

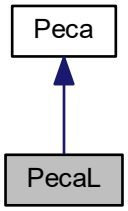
4.14 PecaL Class Reference

`#include <PecaL.hpp>`

Inheritance diagram for PecaL:



Collaboration diagram for PecaL:



Public Member Functions

- PecaL ()
- PecaL (int, int, int, int, int **, int)
- void preencheRealVertex (GLfloat, GLfloat)
- void modificaQuadricula (GLfloat, GLfloat)
- void realVertexBuffer ()
- bool preencheMatriz (int, int, int, int)
- bool atualizaMatriz ()
- bool avaliaPotencialRotacao (int, int, int, int, int, int, int)
- bool avaliaColisao ()
- void atualizaPos ()
- void rotacaoPeca (glm::mat4 &rot)

  *glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot*
- void translacaoPeca (glm::mat4 &trans, bool)
- int collisionYPos ()

- void translacaoPecaContorno (glm::mat4 &trans)
- int dropAccordingToLevel (double)

  Modificar o valor de tempo de acordo com o nivel de jogo.
- int ** getGameGrid ()
- int getNumberRotate ()
- int getNumberTranslation ()
- int getNumberDown ()
- int getXPosD ()
- int getXPosE ()
- bool hasCollidedBottom ()
- bool hasCollidedLeft ()
- bool hasCollidedRight ()
- bool rotationAllowed ()
- void incNumberRotate ()
- void incNumberTranslation ()
- void decNumberTranslation ()
- void incNumberDown ()
- void drawObject ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data

  Desenho da peca.
- static std::vector< GLfloat > g_texture_buffer_data

  Textura da peca.
- static std::vector< GLfloat > g_real_vertex_buffer = {}
- static std::vector< GLfloat > g_vertex_buffer_dataPos
- static std::vector< GLfloat > g_texture_buffer_dataPos

  Textura da posicao de colisao da peca.

4.14.1 Constructor & Destructor Documentation

4.14.1.1 PecaL() [1/2]

```
PecaL::PecaL ( )
```

4.14.1.2 PecaL() [2/2]

```
PecaL::PecaL (
            int xPosInicial,
            int yPosInicial,
            int iHeight,
            int iWidth,
            int ** gameGrid,
            int iGameLevel )
```

4.14.2 Member Function Documentation

4.14.2.1 atualizaMatriz()

```
bool PecaL::atualizaMatriz ( )  [virtual]
```

Implements Peca.

4.14.2.2 atualizaPos()

```
void PecaL::atualizaPos ( )  [virtual]
```

Implements Peca.

4.14.2.3 avaliaColisao()

```
bool PecaL::avaliaColisao ( )  [virtual]
```

Implements Peca.

4.14.2.4 avaliaPotencialRotacao()

```
bool PecaL::avaliaPotencialRotacao (
            int x,
            int y,
            int xAjuste,
            int yAjuste,
            int iPieceHeight,
            int xPosE,
            int xPosD )
```

4.14.2.5 collisionYPos()

```
int PecaL::collisionYPos ( )  [virtual]
```

Implements Peca.

4.14.2.6 decNumberTranslation()

```
void PecaL::decNumberTranslation ( )  [virtual]
```

Implements Peca.

4.14.2.7 drawObject()

```
void PecaL::drawObject ( )  [virtual]
```

Implements Peca.

4.14.2.8 dropAccordingToLevel()

```
int PecaL::dropAccordingToLevel (
            double x )  [virtual]
```

Modificar o valor de tempo de acordo com o nivel de jogo.

Implements Peca.

4.14.2.9 getGameGrid()

```
int ** PecaL::getGameGrid ( )  [virtual]
```

Implements Peca.

4.14.2.10 getNumberDown()

```
int PecaL::getNumberDown ( )  [virtual]
```

Implements Peca.

4.14.2.11 getNumberRotate()

```
int PecaL::getNumberRotate ( )  [virtual]
```

Implements Peca.

4.14.2.12 getNumberTranslation()

```
int PecaL::getNumberTranslation ( )  [virtual]
```

Implements Peca.

4.14.2.13 getXPosD()

```
int PecaL::getXPosD ( )  [virtual]
```

Implements Peca.

4.14.2.14 getXPosE()

```
int PecaL::getXPosE ( )  [virtual]
```

Implements Peca.

4.14.2.15 hasCollidedBottom()

```
bool PecaL::hasCollidedBottom ( )  [virtual]
```

Implements Peca.

4.14.2.16 hasCollidedLeft()

```
bool PecaL::hasCollidedLeft ( )  [virtual]
```

Implements Peca.

4.14.2.17 hasCollidedRight()

```
bool PecaL::hasCollidedRight ( )  [virtual]
```

Implements Peca.

4.14.2.18 incNumberDown()

```
void PecaL::incNumberDown ( )  [virtual]
```

Implements Peca.

4.14.2.19 incNumberRotate()

```
void PecaL::incNumberRotate ( )  [virtual]
```

Implements Peca.

4.14.2.20 incNumberTranslation()

```
void PecaL::incNumberTranslation ( )  [virtual]
```

Implements Peca.

4.14.2.21 modificaQuadricula()

```
void PecaL::modificaQuadricula (
            GLfloat x,
            GLfloat y )  [virtual]
```

Implements Peca.

4.14.2.22 preencheMatriz()

```
bool PecaL::preencheMatriz (
            int x,
            int y,
            int xAjuste,
            int yAjuste )
```

4.14.2.23 preencheRealVertex()

```
void PecaL::preencheRealVertex (
            GLfloat x,
            GLfloat y )  [virtual]
```

Preenchimento do vertexBuffer de acordo com rotacao da peca e local de colisao, para armazenamento do vertex↩ Buffer das pecas ja jogadas (em Projeto.cpp)

Implements Peca.

4.14.2.24 realVertexBuffer()

```
void PecaL::realVertexBuffer ( )  [virtual]
```

Peca quando desenhada esta na origem. A colisao de peca, promove a invocacao deste metodo que tratara de representar a peca, sob a forma de vertexBuffer, tendo em conta local onde esta colidiu e a rotacao da peca.

Implements Peca.

4.14.2.25 rotacaoPeca()

```
void PecaL::rotacaoPeca (
            glm::mat4 & rot )  [virtual]
```

glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot

Implements Peca.

4.14.2.26 rotationAllowed()

```
bool PecaL::rotationAllowed ( )  [virtual]
```

Implements Peca.

4.14.2.27 translacaoPeca()

```
void PecaL::translacaoPeca (
            glm::mat4 & trans,
            bool bPause )  [virtual]
```

Implements Peca.

4.14.2.28 translacaoPecaContorno()

```
void PecaL::translacaoPecaContorno (
            glm::mat4 & trans )  [virtual]
```

Implements Peca.

4.14.3 Member Data Documentation

4.14.3.1 g_real_vertex_buffer

```
std::vector< GLfloat > PecaL::g_real_vertex_buffer = {}  [static]
```

4.14.3.2 g_texture_buffer_data

```
std::vector< GLfloat > PecaL::g_texture_buffer_data  [static]
```

Textura da peca.

4.14.3.3 g_texture_buffer_dataPos

```
std::vector< GLfloat > PecaL::g_texture_buffer_dataPos  [static]
```

Textura da posicao de colisao da peca.

4.14.3.4 g_vertex_buffer_data

```
std::vector< GLfloat > PecaL::g_vertex_buffer_data  [static]
```

Desenho da peca.

4.14.3.5 g_vertex_buffer_dataPos

```
std::vector<GLfloat> PecaL::g_vertex_buffer_dataPos  [static]
```

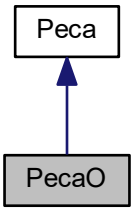
The documentation for this class was generated from the following files:

- headers/PecaL.hpp
- PecaL.cpp

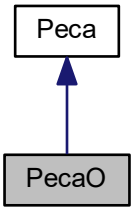
4.15 PecaO Class Reference

`#include <PecaO.hpp>`

Inheritance diagram for PecaO:



Collaboration diagram for PecaO:



Public Member Functions

- PecaO ()
- PecaO (int, int, int, int, int **, int)
- void preencheRealVertex (GLfloat, GLfloat)
- void modificaQuadricula (GLfloat, GLfloat)
- void realVertexBuffer ()
- bool preencheMatriz (int, int)
- bool atualizaMatriz ()
- bool avaliaColisao ()
- void atualizaPos ()
- void rotacaoPeca (glm::mat4 &rot)

  *glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot*
- void translacaoPeca (glm::mat4 &trans, bool)
- int collisionYPos ()
- void translacaoPecaContorno (glm::mat4 &trans)

- int dropAccordingToLevel (double)
- int ** getGameGrid ()
- int getNumberRotate ()
- int getNumberTranslation ()
- int getNumberDown ()
- int getXPosD ()
- int getXPosE ()
- bool hasCollidedBottom ()
- bool hasCollidedLeft ()
- bool hasCollidedRight ()
- bool rotationAllowed ()
- void incNumberRotate ()
- void incNumberTranslation ()
- void decNumberTranslation ()
- void incNumberDown ()
- void drawObject ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data

  Desenho da peca.
- static std::vector< GLfloat > g_texture_buffer_data

  Textura da peca.
- static std::vector< GLfloat > g_real_vertex_buffer = {}
- static std::vector< GLfloat > g_vertex_buffer_dataPos
- static std::vector< GLfloat > g_texture_buffer_dataPos

  Textura da posicao de colisao da peca.

4.15.1 Constructor & Destructor Documentation

4.15.1.1 PecaO() [1/2]

```
PecaO::PecaO ( )
```

4.15.1.2 PecaO() [2/2]

```
PecaO::PecaO (
            int xPosInicial,
            int yPosInicial,
            int iHeight,
            int iWidth,
            int ** gameGrid,
            int iGameLevel )
```

4.15.2 Member Function Documentation

4.15.2.1 atualizaMatriz()

```
bool PecaO::atualizaMatriz ( )  [virtual]
```

Implements Peca.

4.15.2.2 atualizaPos()

```
void PecaO::atualizaPos ( )  [virtual]
```

Implements Peca.

4.15.2.3 avaliaColisao()

```
bool PecaO::avaliaColisao ( )  [virtual]
```

Implements Peca.

4.15.2.4 collisionYPos()

```
int PecaO::collisionYPos ( )  [virtual]
```

Implements Peca.

4.15.2.5 decNumberTranslation()

```
void PecaO::decNumberTranslation ( )  [virtual]
```

Implements Peca.

4.15.2.6 drawObject()

```
void PecaO::drawObject ( )  [virtual]
```

Implements Peca.

4.15.2.7 dropAccordingToLevel()

```
int PecaO::dropAccordingToLevel (
            double x )  [virtual]
```

Implements Peca.

4.15.2.8 getGameGrid()

```
int ** PecaO::getGameGrid ( )  [virtual]
```

Implements Peca.

4.15.2.9 getNumberDown()

```
int PecaO::getNumberDown ( )  [virtual]
```

Implements Peca.

4.15.2.10 getNumberRotate()

```
int PecaO::getNumberRotate ( )  [virtual]
```

Implements Peca.

4.15.2.11 getNumberTranslation()

```
int PecaO::getNumberTranslation ( )  [virtual]
```

Implements Peca.

4.15.2.12 getXPosD()

```
int PecaO::getXPosD ( )  [virtual]
```

Implements Peca.

4.15.2.13 getXPosE()

```
int PecaO::getXPosE ( )  [virtual]
```

Implements Peca.

4.15.2.14 hasCollidedBottom()

```
bool PecaO::hasCollidedBottom ( )  [virtual]
```

Implements Peca.

4.15.2.15 hasCollidedLeft()

```
bool PecaO::hasCollidedLeft ( )  [virtual]
```

Implements Peca.

4.15.2.16 hasCollidedRight()

```
bool PecaO::hasCollidedRight ( )  [virtual]
```

Implements Peca.

4.15.2.17 incNumberDown()

```
void PecaO::incNumberDown ( )  [virtual]
```

Implements Peca.

4.15.2.18 incNumberRotate()

```
void PecaO::incNumberRotate ( )  [virtual]
```

Implements Peca.

4.15.2.19 incNumberTranslation()

```
void PecaO::incNumberTranslation ( )  [virtual]
```

Implements Peca.

4.15.2.20 modificaQuadricula()

```
void PecaO::modificaQuadricula (
            GLfloat x,
            GLfloat y )  [virtual]
```

Implements Peca.

4.15.2.21 preencheMatriz()

```
bool PecaO::preencheMatriz (
            int x,
            int y )
```

4.15.2.22 preencheRealVertex()

```
void PecaO::preencheRealVertex (
            GLfloat x,
            GLfloat y )  [virtual]
```

Implements Peca.

4.15.2.23 realVertexBuffer()

```
void PecaO::realVertexBuffer ( )  [virtual]
```

Peca quando desenhada esta na origem. A colisao de peca, promove a invocacao deste metodo que tratara de representar a peca, sob a forma de vertexBuffer, tendo em conta local onde esta colidiu e a rotacao da peca.

Implements Peca.

4.15.2.24 rotacaoPeca()

```
void PecaO::rotacaoPeca (
            glm::mat4 & rot )  [virtual]
```

glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot

Implements Peca.

4.15.2.25 rotationAllowed()

```
bool PecaO::rotationAllowed ( )  [virtual]
```

Implements Peca.

4.15.2.26 translacaoPeca()

```
void PecaO::translacaoPeca (
            glm::mat4 & trans,
            bool bPause )  [virtual]
```

Implements Peca.

4.15.2.27 translacaoPecaContorno()

```
void PecaO::translacaoPecaContorno (
            glm::mat4 & trans )  [virtual]
```

Implements Peca.

4.15.3 Member Data Documentation

4.15.3.1 g_real_vertex_buffer

```
std::vector< GLfloat > PecaO::g_real_vertex_buffer = {}  [static]
```

4.15.3.2 g_texture_buffer_data

```
std::vector< GLfloat > PecaO::g_texture_buffer_data  [static]
```

Textura da peca.

4.15.3.3 g_texture_buffer_dataPos

```
std::vector< GLfloat > PecaO::g_texture_buffer_dataPos  [static]
```

Textura da posicao de colisao da peca.

4.15.3.4 g_vertex_buffer_data

```
std::vector< GLfloat > PecaO::g_vertex_buffer_data  [static]
```

Desenho da peca.

4.15.3.5 g_vertex_buffer_dataPos

```
std::vector<GLfloat> PecaO::g_vertex_buffer_dataPos  [static]
```

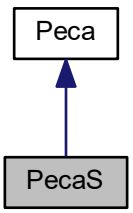
The documentation for this class was generated from the following files:

- headers/PecaO.hpp
- PecaO.cpp

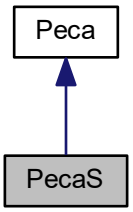
4.16 PecaS Class Reference

```
#include <PecaS.hpp>
```

Inheritance diagram for PecaS:



Collaboration diagram for PecaS:



Public Member Functions

- PecaS ()
- PecaS (int, int, int, int, int $**$, int)
- void preencheRealVertex (GLfloat, GLfloat)
- void modificaQuadricula (GLfloat, GLfloat)
- void realVertexBuffer ()
- bool preencheMatrizCaso0e2 (int, int)
- bool preencheMatrizCaso1e3 (int, int)
- bool atualizaMatriz ()
- bool avaliaPotencialRotacaoCaso0e2 (int, int, int)
- bool avaliaPotencialRotacaoCaso1e3 (int, int, int)
- bool avaliaColisao ()
- void atualizaPos ()
- void rotacaoPeca (glm::mat4 &rot)

  glm::mat4& rot => alternativa a glm::mat4 $*$rot aqui, com chamada de funcao &rot, ao inves de rot
- void translacaoPeca (glm::mat4 &trans, bool)
- int collisionYPos ()
- void translacaoPecaContorno (glm::mat4 &trans)
- int dropAccordingToLevel (double)

  Modificar o valor de tempo de acordo com o nivel de jogo.
- int $**$ getGameGrid ()
- int getNumberRotate ()
- int getNumberTranslation ()
- int getNumberDown ()
- int getXPosD ()
- int getXPosE ()
- bool hasCollidedBottom ()
- bool hasCollidedLeft ()
- bool hasCollidedRight ()
- bool rotationAllowed ()
- void incNumberRotate ()
- void incNumberTranslation ()
- void decNumberTranslation ()
- void incNumberDown ()
- void drawObject ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data

  Desenho da peca.
- static std::vector< GLfloat > g_texture_buffer_data

  Textura da peca.
- static std::vector< GLfloat > g_real_vertex_buffer = {}
- static std::vector< GLfloat > g_vertex_buffer_dataPos
- static std::vector< GLfloat > g_texture_buffer_dataPos

  Textura da posicao de colisao da peca.

4.16.1 Constructor & Destructor Documentation

4.16.1.1 PecaS() [1/2]

```
PecaS::PecaS ( )
```

4.16.1.2 PecaS() [2/2]

```
PecaS::PecaS (
            int xPosInicial,
            int yPosInicial,
            int iHeight,
            int iWidth,
            int ** gameGrid,
            int iGameLevel )
```

4.16.2 Member Function Documentation

4.16.2.1 atualizaMatriz()

```
bool PecaS::atualizaMatriz ( )  [virtual]
```

Implements Peca.

4.16.2.2 atualizaPos()

```
void PecaS::atualizaPos ( )  [virtual]
```

Implements Peca.

4.16.2.3 avaliaColisao()

```
bool PecaS::avaliaColisao ( )  [virtual]
```

Implements Peca.

4.16.2.4 avaliaPotencialRotacaoCaso0e2()

```
bool PecaS::avaliaPotencialRotacaoCaso0e2 (
            int x,
            int y,
            int iPieceWidth )
```

4.16.2.5 avaliaPotencialRotacaoCaso1e3()

```
bool PecaS::avaliaPotencialRotacaoCaso1e3 (
            int x,
            int y,
            int iPieceHeight )
```

4.16.2.6 collisionYPos()

```
int PecaS::collisionYPos ( )  [virtual]
```

Implements Peca.

4.16.2.7 decNumberTranslation()

```
void PecaS::decNumberTranslation ( )  [virtual]
```

Implements Peca.

4.16.2.8 drawObject()

```
void PecaS::drawObject ( )  [virtual]
```

Implements Peca.

4.16.2.9 dropAccordingToLevel()

```
int PecaS::dropAccordingToLevel (
            double x )  [virtual]
```

Modificar o valor de tempo de acordo com o nivel de jogo.

Implements Peca.

4.16.2.10 getGameGrid()

```
int ** PecaS::getGameGrid ( )  [virtual]
```

Implements Peca.

4.16.2.11 getNumberDown()

```
int PecaS::getNumberDown ( )  [virtual]
```

Implements Peca.

4.16.2.12 getNumberRotate()

```
int PecaS::getNumberRotate ( )  [virtual]
```

Implements Peca.

4.16.2.13 getNumberTranslation()

```
int PecaS::getNumberTranslation ( )  [virtual]
```

Implements Peca.

4.16.2.14 getXPosD()

```
int PecaS::getXPosD ( )  [virtual]
```

Implements Peca.

4.16.2.15 getXPosE()

```
int PecaS::getXPosE ( )  [virtual]
```

Implements Peca.

4.16.2.16 hasCollidedBottom()

```
bool PecaS::hasCollidedBottom ( )  [virtual]
```

Implements Peca.

4.16.2.17 hasCollidedLeft()

```
bool PecaS::hasCollidedLeft ( )  [virtual]
```

Implements Peca.

4.16.2.18 hasCollidedRight()

```
bool PecaS::hasCollidedRight ( )  [virtual]
```

Implements Peca.

4.16.2.19 incNumberDown()

```
void PecaS::incNumberDown ( )  [virtual]
```

Implements Peca.

4.16.2.20 incNumberRotate()

```
void PecaS::incNumberRotate ( )  [virtual]
```

Implements Peca.

4.16.2.21 incNumberTranslation()

```
void PecaS::incNumberTranslation ( )  [virtual]
```

Implements Peca.

4.16.2.22 modificaQuadricula()

```
void PecaS::modificaQuadricula (
            GLfloat x,
            GLfloat y )  [virtual]
```

Implements Peca.

4.16.2.23 preencheMatrizCaso0e2()

```
bool PecaS::preencheMatrizCaso0e2 (
            int x,
            int y )
```

4.16.2.24 preencheMatrizCaso1e3()

```
bool PecaS::preencheMatrizCaso1e3 (
            int x,
            int y )
```

4.16.2.25 preencheRealVertex()

```
void PecaS::preencheRealVertex (
            GLfloat x,
            GLfloat y )  [virtual]
```

Preenchimento do vertexBuffer de acordo com rotacao da peca e local de colisao, para armazenamento do vertex↩ Buffer das pecas ja jogadas (em Projeto.cpp)

Implements Peca.

4.16.2.26 realVertexBuffer()

```
void PecaS::realVertexBuffer ( )  [virtual]
```

Peca quando desenhada esta na origem. A colisao de peca, promove a invocacao deste metodo que tratara de representar a peca, sob a forma de vertexBuffer, tendo em conta local onde esta colidiu e a rotacao da peca.

Implements Peca.

4.16.2.27 rotacaoPeca()

```
void PecaS::rotacaoPeca (
            glm::mat4 & rot )  [virtual]
```

glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot

Implements Peca.

4.16.2.28 rotationAllowed()

```
bool PecaS::rotationAllowed ( )  [virtual]
```

Implements Peca.

4.16.2.29 translacaoPeca()

```
void PecaS::translacaoPeca (
            glm::mat4 & trans,
            bool bPause )  [virtual]
```

Implements Peca.

4.16.2.30 translacaoPecaContorno()

```
void PecaS::translacaoPecaContorno (
            glm::mat4 & trans )  [virtual]
```

Implements Peca.

4.16.3 Member Data Documentation

4.16.3.1 g_real_vertex_buffer

```
std::vector< GLfloat > PecaS::g_real_vertex_buffer = {}  [static]
```

4.16.3.2 g_texture_buffer_data

```
std::vector< GLfloat > PecaS::g_texture_buffer_data  [static]
```

Textura da peca.

4.16.3.3 g_texture_buffer_dataPos

```
std::vector< GLfloat > PecaS::g_texture_buffer_dataPos  [static]
```

Textura da posicao de colisao da peca.

4.16.3.4 g_vertex_buffer_data

```
std::vector< GLfloat > PecaS::g_vertex_buffer_data  [static]
```

Desenho da peca.

4.16.3.5 g_vertex_buffer_dataPos

```
std::vector<GLfloat> PecaS::g_vertex_buffer_dataPos  [static]
```

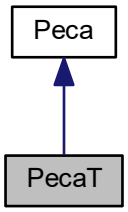
The documentation for this class was generated from the following files:

- headers/PecaS.hpp
- PecaS.cpp

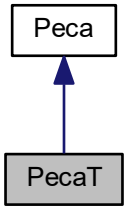
4.17 PecaT Class Reference

`#include <PecaT.hpp>`

Inheritance diagram for PecaT:



Collaboration diagram for PecaT:



Public Member Functions

- PecaT ()
- PecaT (int, int, int, int, int $**$, int)
- void preencheRealVertex (GLfloat, GLfloat)
- void modificaQuadricula (GLfloat, GLfloat)

  Modificacao de um bloco/quadricula da peca, repesentado por 2 triangulos.
- void realVertexBuffer ()
- bool preencheMatriz (int, int, int, int)
- bool atualizaMatriz ()
- bool avaliaPotencialRotacao (int, int, int, int, int, int, int)
- bool avaliaColisao ()
- void atualizaPos ()
- void rotacaoPeca (glm::mat4 &rot)

  glm::mat4& rot => alternativa a glm::mat4 $*$rot aqui, com chamada de funcao &rot, ao inves de rot
- void translacaoPeca (glm::mat4 &trans, bool)

- int collisionYPos ()
- void translacaoPecaContorno (glm::mat4 &trans)
- int dropAccordingToLevel (double)

  Modificar o valor de tempo de acordo com o nivel de jogo.
- int ** getGameGrid ()
- int getNumberRotate ()
- int getNumberTranslation ()
- int getNumberDown ()
- int getXPosD ()
- int getXPosE ()
- bool hasCollidedBottom ()
- bool hasCollidedLeft ()
- bool hasCollidedRight ()
- bool rotationAllowed ()
- void incNumberRotate ()
- void incNumberTranslation ()
- void decNumberTranslation ()
- void incNumberDown ()
- void drawObject ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data

  Desenho da peca.
- static std::vector< GLfloat > g_texture_buffer_data

  Textura da peca.
- static std::vector< GLfloat > g_real_vertex_buffer = {}
- static std::vector< GLfloat > g_vertex_buffer_dataPos
- static std::vector< GLfloat > g_texture_buffer_dataPos

  Textura da posicao de colisao da peca.

4.17.1 Constructor & Destructor Documentation

4.17.1.1 PecaT() [1/2]

```
PecaT::PecaT ( )
```

4.17.1.2 PecaT() [2/2]

```
PecaT::PecaT (
            int xPosInicial,
            int yPosInicial,
            int iHeight,
            int iWidth,
            int ** gameGrid,
            int iGameLevel )
```

4.17.2 Member Function Documentation

4.17.2.1 atualizaMatriz()

```
bool PecaT::atualizaMatriz ( )  [virtual]
```

Implements Peca.

4.17.2.2 atualizaPos()

```
void PecaT::atualizaPos ( )  [virtual]
```

Implements Peca.

4.17.2.3 avaliaColisao()

```
bool PecaT::avaliaColisao ( )  [virtual]
```

Implements Peca.

4.17.2.4 avaliaPotencialRotacao()

```
bool PecaT::avaliaPotencialRotacao (
            int x,
            int y,
            int xAjuste,
            int yAjuste,
            int iPieceHeight,
            int xPosE,
            int xPosD )
```

4.17.2.5 collisionYPos()

```
int PecaT::collisionYPos ( )  [virtual]
```

Implements Peca.

4.17.2.6 decNumberTranslation()

```
void PecaT::decNumberTranslation ( )  [virtual]
```

Implements Peca.

4.17.2.7 drawObject()

```
void PecaT::drawObject ( )  [virtual]
```

Implements Peca.

4.17.2.8 dropAccordingToLevel()

```
int PecaT::dropAccordingToLevel (
            double x )  [virtual]
```

Modificar o valor de tempo de acordo com o nivel de jogo.

Implements Peca.

4.17.2.9 getGameGrid()

```
int ** PecaT::getGameGrid ( )  [virtual]
```

Implements Peca.

4.17.2.10 getNumberDown()

```
int PecaT::getNumberDown ( )  [virtual]
```

Implements Peca.

4.17.2.11 getNumberRotate()

```
int PecaT::getNumberRotate ( )  [virtual]
```

Implements Peca.

4.17.2.12 getNumberTranslation()

```
int PecaT::getNumberTranslation ( )  [virtual]
```

Implements Peca.

4.17.2.13 getXPosD()

```
int PecaT::getXPosD ( )  [virtual]
```

Implements Peca.

4.17.2.14 getXPosE()

```
int PecaT::getXPosE ( )  [virtual]
```

Implements Peca.

4.17.2.15 hasCollidedBottom()

```
bool PecaT::hasCollidedBottom ( )  [virtual]
```

Implements Peca.

4.17.2.16 hasCollidedLeft()

```
bool PecaT::hasCollidedLeft ( )  [virtual]
```

Implements Peca.

4.17.2.17 hasCollidedRight()

```
bool PecaT::hasCollidedRight ( )  [virtual]
```

Implements Peca.

4.17.2.18 incNumberDown()

```
void PecaT::incNumberDown ( )  [virtual]
```

Implements Peca.

4.17.2.19 incNumberRotate()

```
void PecaT::incNumberRotate ( )  [virtual]
```

Implements Peca.

4.17.2.20 incNumberTranslation()

```
void PecaT::incNumberTranslation ( )  [virtual]
```

Implements Peca.

4.17.2.21 modificaQuadricula()

```
void PecaT::modificaQuadricula (
            GLfloat x,
            GLfloat y )  [virtual]
```

Modificacao de um bloco/quadricula da peca, repesentado por 2 triangulos.

Implements Peca.

4.17.2.22 preencheMatriz()

```
bool PecaT::preencheMatriz (
            int x,
            int y,
            int xAjuste,
            int yAjuste )
```

4.17.2.23 preencheRealVertex()

```
void PecaT::preencheRealVertex (
            GLfloat x,
            GLfloat y )  [virtual]
```

Preenchimento do vertexBuffer de acordo com rotacao da peca e local de colisao, para armazenamento do vertex↩ Buffer das pecas ja jogadas (em Projeto.cpp)

Implements Peca.

4.17.2.24 realVertexBuffer()

```
void PecaT::realVertexBuffer ( )  [virtual]
```

Peca quando desenhada esta na origem. A colisao de peca, promove a invocacao deste metodo que tratara de representar a peca, sob a forma de vertexBuffer, tendo em conta local onde esta colidiu e a rotacao da peca.

Implements Peca.

4.17.2.25 rotacaoPeca()

```
void PecaT::rotacaoPeca (
            glm::mat4 & rot )  [virtual]
```

glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot

Implements Peca.

4.17.2.26 rotationAllowed()

```
bool PecaT::rotationAllowed ( )  [virtual]
```

Implements Peca.

4.17.2.27 translacaoPeca()

```
void PecaT::translacaoPeca (
            glm::mat4 & trans,
            bool bPause )  [virtual]
```

Implements Peca.

4.17.2.28 translacaoPecaContorno()

```
void PecaT::translacaoPecaContorno (
            glm::mat4 & trans )  [virtual]
```

Implements Peca.

4.17.3 Member Data Documentation

4.17.3.1 g_real_vertex_buffer

```
std::vector< GLfloat > PecaT::g_real_vertex_buffer = {}  [static]
```

4.17.3.2 g_texture_buffer_data

```
std::vector< GLfloat > PecaT::g_texture_buffer_data  [static]
```

Textura da peca.

4.17.3.3 g_texture_buffer_dataPos

```
std::vector< GLfloat > PecaT::g_texture_buffer_dataPos  [static]
```

Textura da posicao de colisao da peca.

4.17.3.4 g_vertex_buffer_data

```
std::vector< GLfloat > PecaT::g_vertex_buffer_data  [static]
```

Desenho da peca.

4.17.3.5 g_vertex_buffer_dataPos

```
std::vector<GLfloat> PecaT::g_vertex_buffer_dataPos  [static]
```

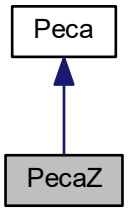
The documentation for this class was generated from the following files:

- headers/PecaT.hpp
- PecaT.cpp

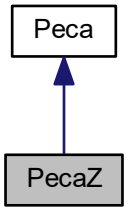
4.18 PecaZ Class Reference

`#include <PecaZ.hpp>`

Inheritance diagram for PecaZ:



Collaboration diagram for PecaZ:



Public Member Functions

- PecaZ ()
- PecaZ (int, int, int, int, int **, int)
- void preencheRealVertex (GLfloat, GLfloat)
- void modificaQuadricula (GLfloat, GLfloat)

  Modificacao de um bloco/quadricula da peca, repesentado por 2 triangulos.
- void realVertexBuffer ()
- bool preencheMatrizCaso0e2 (int, int)
- bool preencheMatrizCaso1e3 (int, int)
- bool atualizaMatriz ()
- bool avaliaColisao ()
- bool avaliaPotencialRotacaoCaso0e2 (int, int, int)
- bool avaliaPotencialRotacaoCaso1e3 (int, int, int)
- void atualizaPos ()
- void rotacaoPeca (glm::mat4 &rot)

*glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot*

- void translacaoPeca (glm::mat4 &trans, bool)
- int collisionYPos ()
- void translacaoPecaContorno (glm::mat4 &trans)
- int dropAccordingToLevel (double)

  Modificar o valor de tempo de acordo com o nivel de jogo.
- int ** getGameGrid ()
- int getNumberRotate ()
- int getNumberTranslation ()
- int getNumberDown ()
- int getXPosD ()
- int getXPosE ()
- bool hasCollidedBottom ()
- bool hasCollidedLeft ()
- bool hasCollidedRight ()
- bool rotationAllowed ()
- void incNumberRotate ()
- void incNumberTranslation ()
- void decNumberTranslation ()
- void incNumberDown ()
- void drawObject ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data

  Desenho da peca.
- static std::vector< GLfloat > g_texture_buffer_data

  Textura da peca.
- static std::vector< GLfloat > g_real_vertex_buffer = {}
- static std::vector< GLfloat > g_vertex_buffer_dataPos
- static std::vector< GLfloat > g_texture_buffer_dataPos

  Textura da posicao de colisao da peca.

4.18.1 Constructor & Destructor Documentation

4.18.1.1 PecaZ() [1/2]

```
PecaZ::PecaZ ( )
```

4.18.1.2 PecaZ() [2/2]

```
PecaZ::PecaZ (
            int xPosInicial,
            int yPosInicial,
            int iHeight,
            int iWidth,
            int ** gameGrid,
            int iGameLevel )
```

4.18.2 Member Function Documentation

4.18.2.1 atualizaMatriz()

```
bool PecaZ::atualizaMatriz ( )  [virtual]
```

Implements Peca.

4.18.2.2 atualizaPos()

```
void PecaZ::atualizaPos ( )  [virtual]
```

Implements Peca.

4.18.2.3 avaliaColisao()

```
bool PecaZ::avaliaColisao ( )  [virtual]
```

Implements Peca.

4.18.2.4 avaliaPotencialRotacaoCaso0e2()

```
bool PecaZ::avaliaPotencialRotacaoCaso0e2 (
            int x,
            int y,
            int iPieceWidth )
```

4.18.2.5 avaliaPotencialRotacaoCaso1e3()

```
bool PecaZ::avaliaPotencialRotacaoCaso1e3 (
            int x,
            int y,
            int iPieceHeight )
```

4.18.2.6 collisionYPos()

```
int PecaZ::collisionYPos ( )  [virtual]
```

Implements Peca.

4.18.2.7 decNumberTranslation()

```
void PecaZ::decNumberTranslation ( )  [virtual]
```

Implements Peca.

4.18.2.8 drawObject()

```
void PecaZ::drawObject ( )  [virtual]
```

Implements Peca.

4.18.2.9 dropAccordingToLevel()

```
int PecaZ::dropAccordingToLevel (
            double x )  [virtual]
```

Modificar o valor de tempo de acordo com o nivel de jogo.

Implements Peca.

4.18.2.10 getGameGrid()

```
int ** PecaZ::getGameGrid ( )  [virtual]
```

Implements Peca.

4.18.2.11 getNumberDown()

```
int PecaZ::getNumberDown ( )  [virtual]
```

Implements Peca.

4.18.2.12 getNumberRotate()

```
int PecaZ::getNumberRotate ( )  [virtual]
```

Implements Peca.

4.18.2.13 getNumberTranslation()

```
int PecaZ::getNumberTranslation ( )  [virtual]
```

Implements Peca.

4.18.2.14 getXPosD()

```
int PecaZ::getXPosD ( )  [virtual]
```

Implements Peca.

4.18.2.15 getXPosE()

```
int PecaZ::getXPosE ( )  [virtual]
```

Implements Peca.

4.18.2.16 hasCollidedBottom()

```
bool PecaZ::hasCollidedBottom ( )  [virtual]
```

Implements Peca.

4.18.2.17 hasCollidedLeft()

```
bool PecaZ::hasCollidedLeft ( )  [virtual]
```

Implements Peca.

4.18.2.18 hasCollidedRight()

```
bool PecaZ::hasCollidedRight ( )  [virtual]
```

Implements Peca.

4.18.2.19 incNumberDown()

```
void PecaZ::incNumberDown ( )  [virtual]
```

Implements Peca.

4.18.2.20 incNumberRotate()

```
void PecaZ::incNumberRotate ( )  [virtual]
```

Implements Peca.

4.18.2.21 incNumberTranslation()

```
void PecaZ::incNumberTranslation ( )  [virtual]
```

Implements Peca.

4.18.2.22 modificaQuadricula()

```
void PecaZ::modificaQuadricula (
            GLfloat x,
            GLfloat y )  [virtual]
```

Modificacao de um bloco/quadricula da peca, repesentado por 2 triangulos.

Implements Peca.

4.18.2.23 preencheMatrizCaso0e2()

```
bool PecaZ::preencheMatrizCaso0e2 (
            int x,
            int y )
```

4.18.2.24 preencheMatrizCaso1e3()

```
bool PecaZ::preencheMatrizCaso1e3 (
            int x,
            int y )
```

4.18.2.25 preencheRealVertex()

```
void PecaZ::preencheRealVertex (
            GLfloat x,
            GLfloat y )  [virtual]
```

Preenchimento do vertexBuffer de acordo com rotacao da peca e local de colisao, para armazenamento do vertex↩ Buffer das pecas ja jogadas (em Projeto.cpp)

Implements Peca.

4.18.2.26 realVertexBuffer()

```
void PecaZ::realVertexBuffer ( )  [virtual]
```

Peca quando desenhada esta na origem. A colisao de peca, promove a invocacao deste metodo que tratara de representar a peca, sob a forma de vertexBuffer, tendo em conta local onde esta colidiu e a rotacao da peca.

Implements Peca.

4.18.2.27 rotacaoPeca()

```
void PecaZ::rotacaoPeca (
            glm::mat4 & rot )  [virtual]
```

glm::mat4& rot => alternativa a glm::mat4 *rot aqui, com chamada de funcao &rot, ao inves de rot

Implements Peca.

4.18.2.28 rotationAllowed()

```
bool PecaZ::rotationAllowed ( )  [virtual]
```

Implements Peca.

4.18.2.29 translacaoPeca()

```
void PecaZ::translacaoPeca (
            glm::mat4 & trans,
            bool bPause )  [virtual]
```

Implements Peca.

4.18.2.30 translacaoPecaContorno()

```
void PecaZ::translacaoPecaContorno (
            glm::mat4 & trans )  [virtual]
```

Implements Peca.

4.18.3 Member Data Documentation

4.18.3.1 g_real_vertex_buffer

```
std::vector< GLfloat > PecaZ::g_real_vertex_buffer = {}  [static]
```

4.18.3.2 g_texture_buffer_data

```
std::vector< GLfloat > PecaZ::g_texture_buffer_data  [static]
```

Textura da peca.

4.18.3.3 g_texture_buffer_dataPos

```
std::vector< GLfloat > PecaZ::g_texture_buffer_dataPos  [static]
```

Textura da posicao de colisao da peca.

4.18.3.4 g_vertex_buffer_data

```
std::vector< GLfloat > PecaZ::g_vertex_buffer_data  [static]
```

Desenho da peca.

4.18.3.5 g_vertex_buffer_dataPos

```
std::vector<GLfloat> PecaZ::g_vertex_buffer_dataPos  [static]
```

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

- headers/PecaZ.hpp
- PecaZ.cpp

4.19 Score Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Score ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.19.1 Constructor & Destructor Documentation

4.19.1.1 Score()

```
Score::Score ( )
```

4.19.2 Member Data Documentation

4.19.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Score::g_texture_buffer_data  [static]
```

4.19.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Score::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.20 Seven Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Seven ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.20.1 Constructor & Destructor Documentation

4.20.1.1 Seven()

```
Seven::Seven ( )
```

4.20.2 Member Data Documentation

4.20.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Seven::g_texture_buffer_data  [static]
```

Initial value:

```
= {

        0.51f,  1.0f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,  0.76f,

        0.51f,  1.0f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,   1.0f,
        0.51f,  0.76f,
        0.74f,  0.76f,
}
```

4.20.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Seven::g_vertex_buffer_data  [static]
```

Initial value:

```
= {

        0.0f, 1.4f, 0.0f,
        1.0f, 1.4f, 0.0f,
        0.0f, 1.6f, 0.0f,
        1.0f, 1.4f, 0.0f,
        0.0f, 1.6f, 0.0f,
        1.0f, 1.6f, 0.0f,

        0.8f, 0.0f, 0.0f,
        1.0f, 0.0f, 0.0f,
        0.8f, 1.6f, 0.0f,
        1.0f, 0.0f, 0.0f,
        0.8f, 1.6f, 0.0f,
        1.0f, 1.6f, 0.0f,
}
```

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

- headers/Font.hpp
- Font.cpp

4.21 Six Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Six ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.21.1 Constructor & Destructor Documentation

4.21.1.1 Six()

```
Six::Six ( )
```

4.21.2 Member Data Documentation

4.21.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Six::g_texture_buffer_data  [static]
```

4.21.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Six::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.22 stbi_io_callbacks Struct Reference

```
#include <stb_image.h>
```

Public Attributes

- int(* read)(void *user, char *data, int size)
- void(* skip)(void *user, int n)
- int(* eof)(void *user)

4.22.1 Member Data Documentation

4.22.1.1 eof

```
int(* stbi_io_callbacks::eof) (void *user)
```

4.22.1.2 read

```
int(* stbi_io_callbacks::read) (void *user, char *data, int size)
```

4.22.1.3 skip

```
void(* stbi_io_callbacks::skip) (void *user, int n)
```

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

- headers/stb_image.h

4.23 Three Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Three ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.23.1 Constructor & Destructor Documentation

4.23.1.1 Three()

```
Three::Three ( )
```

4.23.2 Member Data Documentation

4.23.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Three::g_texture_buffer_data  [static]
```

4.23.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Three::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.24 Two Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Two ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.24.1 Constructor & Destructor Documentation

4.24.1.1 Two()

```
Two::Two ( )
```

4.24.2 Member Data Documentation

4.24.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Two::g_texture_buffer_data  [static]
```

4.24.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Two::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

4.25 Zero Class Reference

```
#include <Font.hpp>
```

Public Member Functions

- Zero ()

Static Public Attributes

- static std::vector< GLfloat > g_vertex_buffer_data
- static std::vector< GLfloat > g_texture_buffer_data

4.25.1 Constructor & Destructor Documentation

4.25.1.1 Zero()

```
Zero::Zero ( )
```

4.25.2 Member Data Documentation

4.25.2.1 g_texture_buffer_data

```
std::vector< GLfloat > Zero::g_texture_buffer_data  [static]
```

4.25.2.2 g_vertex_buffer_data

```
std::vector< GLfloat > Zero::g_vertex_buffer_data  [static]
```

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

- headers/Font.hpp
- Font.cpp

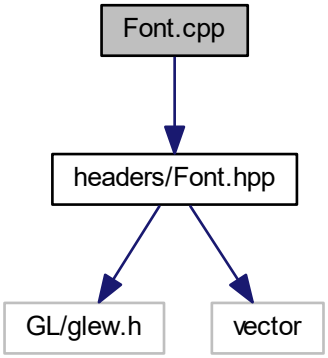
Chapter 5

File Documentation

5.1 Font.cpp File Reference

```
#include "headers/Font.hpp"
```

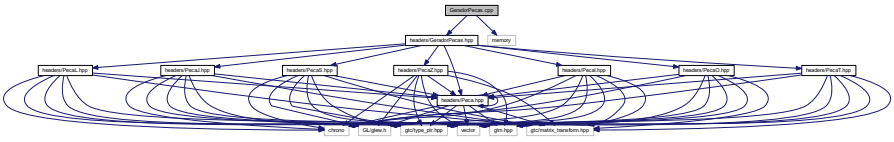
Include dependency graph for Font.cpp:



5.2 GeradorPecas.cpp File Reference

```
#include "headers/GeradorPecas.hpp"
#include <memory>
```

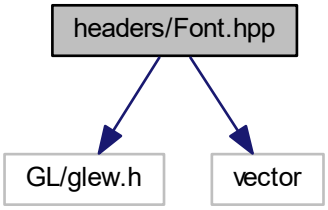
Include dependency graph for GeradorPecas.cpp:



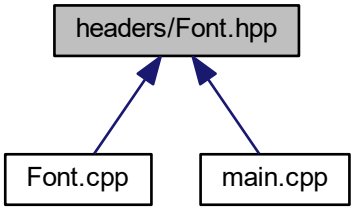
5.3 headers/Font.hpp File Reference

```
#include <GL/glew.h>
#include <vector>
```

Include dependency graph for Font.hpp:



This graph shows which files directly or indirectly include this file:



Classes

- class Zero
- class One
- class Two
- class Three
- class Four
- class Five
- class Six
- class Seven
- class Eight
- class Nine
- class Score
- class Level
- class Lines
- class Next
- class Hold

Macros

- #define GLEW_STATIC

5.3.1 Macro Definition Documentation

5.3.1.1 GLEW_STATIC

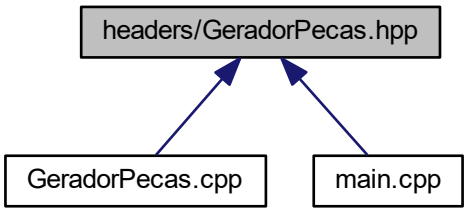
```
#define GLEW_STATIC
```

5.4 headers/GeradorPecas.hpp File Reference

```
#include "headers/PecaL.hpp"
#include "headers/PecaJ.hpp"
#include "headers/PecaS.hpp"
#include "headers/PecaI.hpp"
#include "headers/PecaZ.hpp"
#include "headers/PecaO.hpp"
#include "headers/PecaT.hpp"
#include "headers/Peca.hpp"
```

Include dependency graph for GeradorPecas.hpp:

This graph shows which files directly or indirectly include this file:



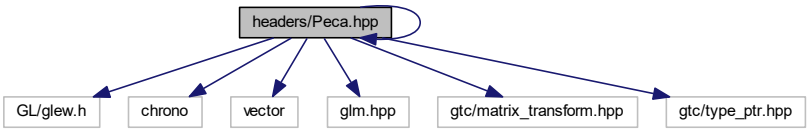
Classes

- class GeradorPecas

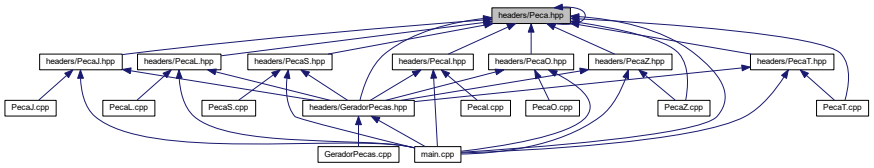
5.5 headers/Peca.hpp File Reference

```
#include "headers/Peca.hpp"
#include <GL/glew.h>
#include <chrono>
#include <vector>
#include <glm.hpp>
#include <gtc/matrix_transform.hpp>
#include <gtc/type_ptr.hpp>
```

Include dependency graph for Peca.hpp:



This graph shows which files directly or indirectly include this file:



Classes

- class Peca

Macros

- #define GLEW_STATIC

5.5.1 Macro Definition Documentation

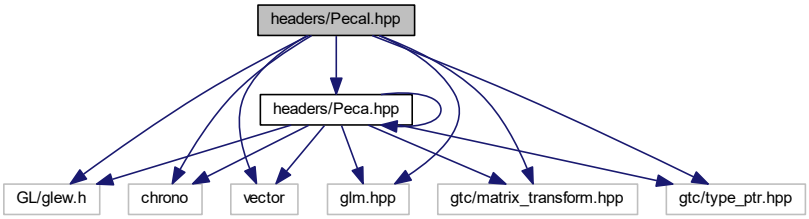
5.5.1.1 GLEW_STATIC

```
#define GLEW_STATIC
```

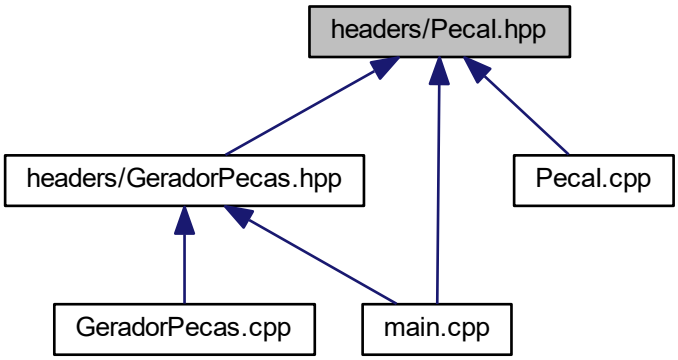
5.6 headers/Pecal.hpp File Reference

```
#include "headers/Peca.hpp"
#include <GL/glew.h>
#include <chrono>
#include <vector>
#include <glm.hpp>
#include <gtc/matrix_transform.hpp>
#include <gtc/type_ptr.hpp>
```

Include dependency graph for Pecal.hpp:



This graph shows which files directly or indirectly include this file:



Classes

- class Pecal

Macros

- #define GLEW_STATIC

5.6.1 Macro Definition Documentation

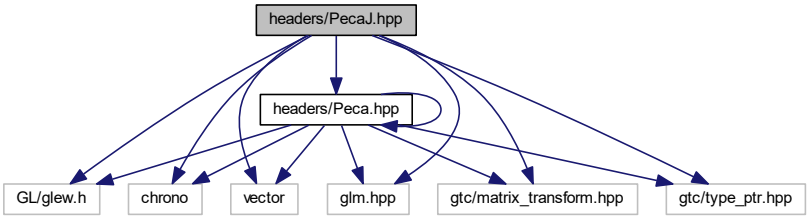
5.6.1.1 GLEW_STATIC

```
#define GLEW_STATIC
```

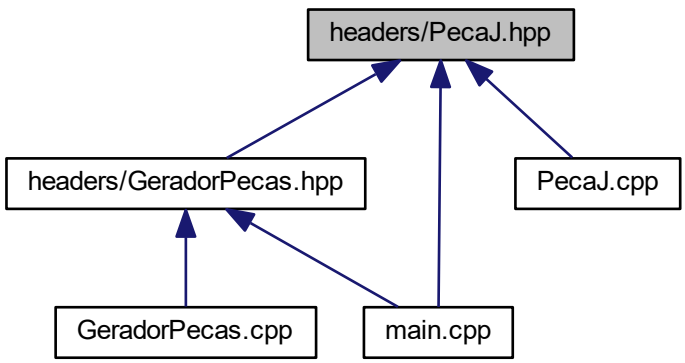
5.7 headers/PecaJ.hpp File Reference

```
#include "headers/Peca.hpp"
#include <GL/glew.h>
#include <chrono>
#include <vector>
#include <glm.hpp>
#include <gtc/matrix_transform.hpp>
#include <gtc/type_ptr.hpp>
```

Include dependency graph for PecaJ.hpp:



This graph shows which files directly or indirectly include this file:



Classes

- class PecaJ

Macros

- #define GLEW_STATIC

5.7.1 Macro Definition Documentation

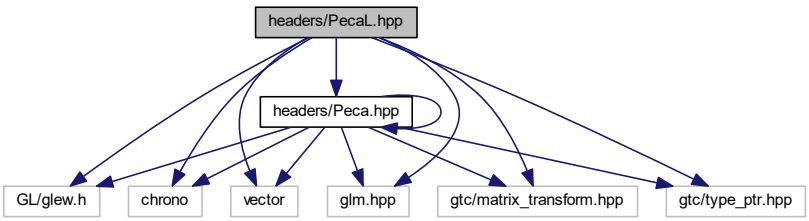
5.7.1.1 GLEW_STATIC

```
#define GLEW_STATIC
```

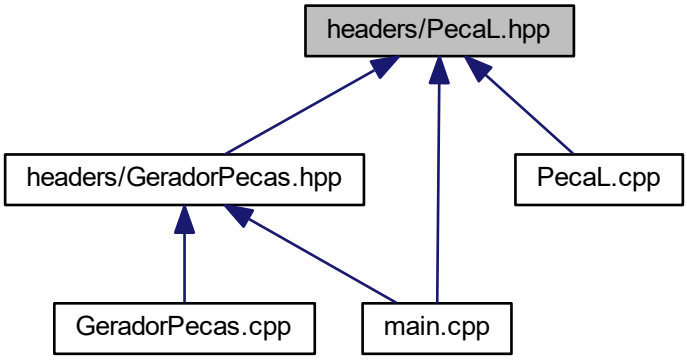
5.8 headers/PecaL.hpp File Reference

```
#include "headers/Peca.hpp"
#include <GL/glew.h>
#include <chrono>
#include <vector>
#include <glm.hpp>
#include <gtc/matrix_transform.hpp>
#include <gtc/type_ptr.hpp>
```

Include dependency graph for PecaL.hpp:



This graph shows which files directly or indirectly include this file:



Classes

- class PecaL

Macros

- #define GLEW_STATIC

5.8.1 Macro Definition Documentation

5.8.1.1 GLEW_STATIC

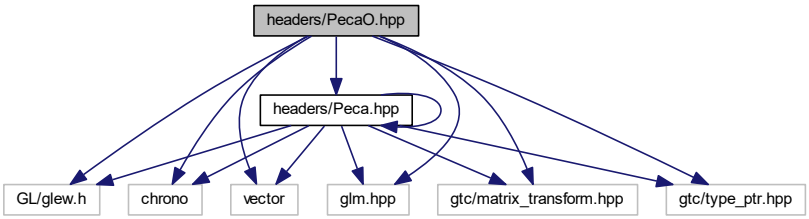
```
#define GLEW_STATIC
```

5.9 headers/PecaO.hpp File Reference

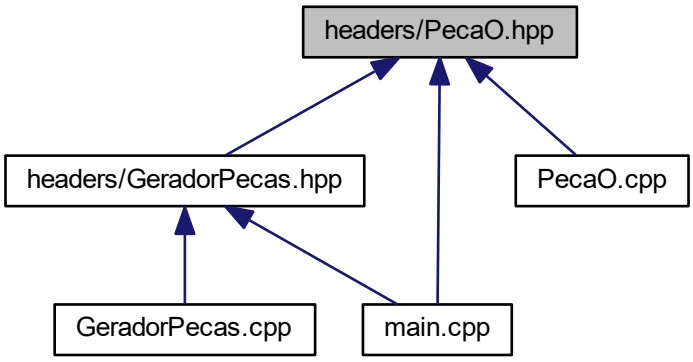
```
#include "headers/Peca.hpp"
#include <GL/glew.h>
#include <chrono>
#include <vector>
#include <glm.hpp>
#include <gtc/matrix_transform.hpp>
```

```
#include <gtc/type_ptr.hpp>
```

Include dependency graph for PecaO.hpp:



This graph shows which files directly or indirectly include this file:



Classes

- class PecaO

Macros

- #define GLEW_STATIC

5.9.1 Macro Definition Documentation

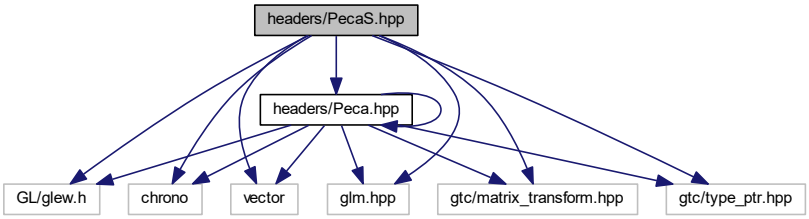
5.9.1.1 GLEW_STATIC

```
#define GLEW_STATIC
```

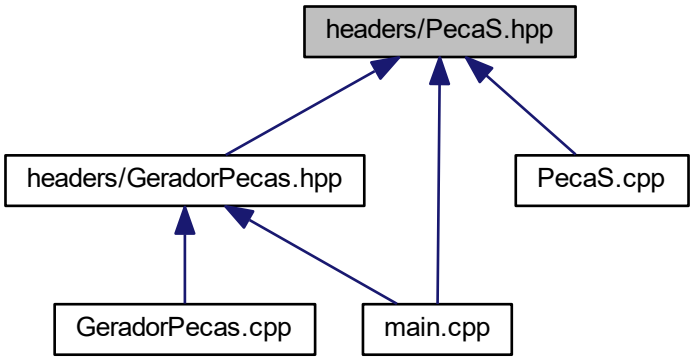
5.10 headers/PecaS.hpp File Reference

```
#include "headers/Peca.hpp"
#include <GL/glew.h>
#include <chrono>
#include <vector>
#include <glm.hpp>
#include <gtc/matrix_transform.hpp>
#include <gtc/type_ptr.hpp>
```

Include dependency graph for PecaS.hpp:



This graph shows which files directly or indirectly include this file:



Classes

- class PecaS

Macros

- #define GLEW_STATIC

5.10.1 Macro Definition Documentation

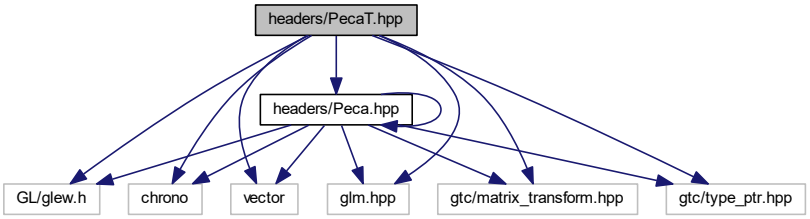
5.10.1.1 GLEW_STATIC

```
#define GLEW_STATIC
```

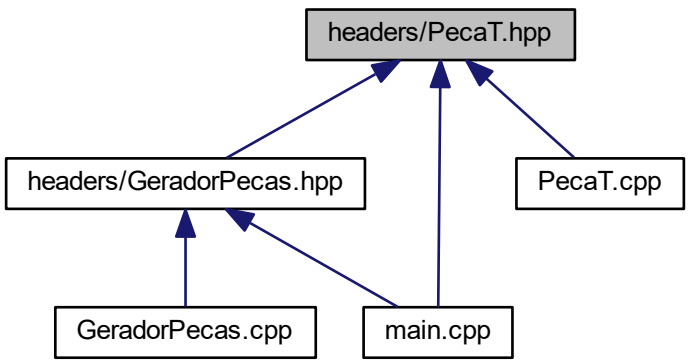
5.11 headers/PecaT.hpp File Reference

```
#include "headers/Peca.hpp"
#include <GL/glew.h>
#include <chrono>
#include <vector>
#include <glm.hpp>
#include <gtc/matrix_transform.hpp>
#include <gtc/type_ptr.hpp>
```

Include dependency graph for PecaT.hpp:



This graph shows which files directly or indirectly include this file:



Classes

- class PecaT

Macros

- #define GLEW_STATIC

5.11.1 Macro Definition Documentation

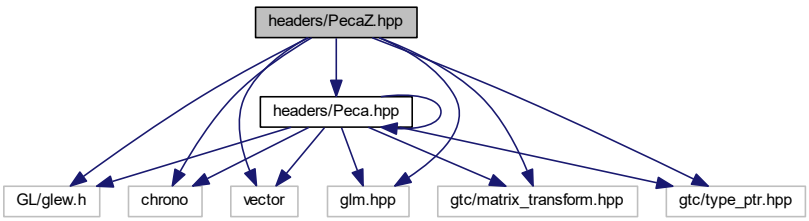
5.11.1.1 GLEW_STATIC

```
#define GLEW_STATIC
```

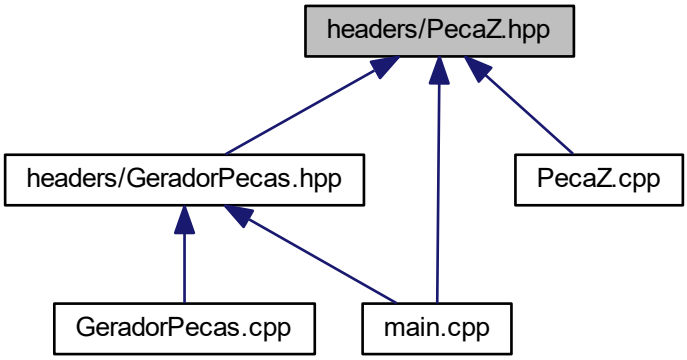
5.12 headers/PecaZ.hpp File Reference

```
#include "headers/Peca.hpp"
#include <GL/glew.h>
#include <chrono>
#include <vector>
#include <glm.hpp>
#include <gtc/matrix_transform.hpp>
#include <gtc/type_ptr.hpp>
```

Include dependency graph for PecaZ.hpp:



This graph shows which files directly or indirectly include this file:



Classes

- class PecaZ

Macros

- #define GLEW_STATIC

5.12.1 Macro Definition Documentation

5.12.1.1 GLEW_STATIC

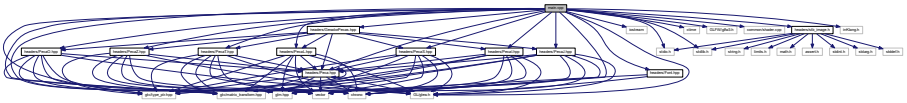
```
#define GLEW_STATIC
```

5.13 main.cpp File Reference

```
#include "headers/PecaL.hpp"
#include "headers/PecaJ.hpp"
#include "headers/PecaS.hpp"
#include "headers/PecaI.hpp"
#include "headers/PecaZ.hpp"
#include "headers/PecaO.hpp"
#include "headers/PecaT.hpp"
#include "headers/Peca.hpp"
#include "headers/GeradorPecas.hpp"
```

```
#include "headers/Font.hpp"
#include <iostream>
#include <stdio.h>
#include <stdlib.h>
#include <chrono>
#include <ctime>
#include <GL/glew.h>
#include <GLFW/glfw3.h>
#include <glm.hpp>
#include <gtc/matrix_transform.hpp>
#include <gtc/type_ptr.hpp>
#include <common/shader.cpp>
#include "headers/stb_image.h"
#include <irrKlang.h>
```

Include dependency graph for main.cpp:



Macros

- #define GLEW_STATIC
- #define STB_IMAGE_IMPLEMENTATION

Functions

- void incializaMatrizZero ()

  Inicializar matriz a zeros.
- int randNum ()

  Generates random number from 0 to 6 (7 pieces)
- int pontosPorLinhasEliminadas (int iNumbLinhasEliminadas)
- void somPassagemNivel ()
- void atualizaNivelJogo ()
- Peca * returnPeca (GeradorPecas &geraPecas, int switchValue)
- std::vector< GLfloat > vertexBufferPiece (Peca &pPeca, int switchValue)
- std::vector< GLfloat > textureBufferPiece (Peca &pPeca, int switchValue)
- std::vector< GLfloat > * realVertexBufferPiece (Peca &pPeca)
- std::vector< GLfloat > textureBufferPosPiece (Peca &pPeca, int switchValue)
- std::vector< GLfloat > vertexBufferNumber (int switchValue)
- std::vector< GLfloat > textureBufferNumber (int switchValue)
- void transferDataToGPUMemory (Peca &pPeca, Peca &pNextPeca, Peca &pSavedPeca)
- void cleanupDataFromGPU ()
- void drawScore (int iScore)
- void drawLevel (int iLevel)
- void drawLines (int iLines)
- void desenhaAmbiente ()

  Função para desenhar todo o ambiente, sem instanciar peças (usado aquando da eliminação de linhas)
- void eliminaLinha (int iLinha)
- void atualizaCampoJogo (int iLinha)
- std::vector< int > avaliaEliminacaoLinhas (int **gameGrid)

Verifica, na matriz de inteiros, linhas que apenas contenham 1's, ou seja, linhas que terão de ser eliminadas.

- bool evaluatePieceCollision (Peca &pPeca)
- bool drawCurrentObject (Peca &pPeca)
- void drawObjects (int iIdentificador)
- void setMVP_And_UniqueLoads ()
- void registerUserInputs (Peca &pPeca)

  Retains information of user inputs, regarding piece movement.
- int main (void)

Variables

- GLFWwindow * window
- GLuint VertexArrayID

  Vertex array object (VAO)
- GLuint TextureID [4]

  Texture array object (TAO)
- GLuint vertexbuffer

  Vertex buffer object (VBO)
- GLuint vertexbufferTot
- GLuint vertexbufferNextPiece
- GLuint vertexbufferSavedPiece
- GLuint vertexbufferBackground
- GLuint vertexbufferPosPiece
- GLuint vertexbufferGrid
- GLuint vertexbufferScore
- GLuint vertexbufferScoreNum
- GLuint vertexbufferLevel
- GLuint vertexbufferLevelNum
- GLuint vertexbufferLines
- GLuint vertexbufferLinesNum
- GLuint vertexbufferNext
- GLuint vertexbufferHold
- GLuint vertexbufferPause
- GLuint vertexbufferGameOver
- GLuint vertexbufferControls
- GLuint texturebuffer

  Texture buffer object (TBO)
- GLuint texturebufferTot
- GLuint texturebufferNextPiece
- GLuint texturebufferSavedPiece
- GLuint texturebufferBackground
- GLuint texturebufferPosPiece
- GLuint texturebufferGrid
- GLuint texturebufferScore
- GLuint texturebufferScoreNum
- GLuint texturebufferLevel
- GLuint texturebufferLevelNum
- GLuint texturebufferLines
- GLuint texturebufferLinesNum
- GLuint texturebufferNext
- GLuint texturebufferHold
- GLuint texturebufferPause
- GLuint texturebufferGameOver

- GLuint texturebufferControls
- GLuint programID

  GLSL program from the shaders.
- int const iWidth = 10
- int const iHeight = 20
- GLfloat WIDTH_PosXInicial = 10.f
- GLfloat HEIGHT_PosYInicial = 18.f
- GLfloat WIDTH = 14.f
- GLfloat HEIGHT = 20.f
- GLint WindowHeight = 600
- GLint WindowWidth = WIDTH / HEIGHT * WindowHeight
- char vertexShader [ ] = "shaders/vertexShader.vertexshader"
- char fragmentShader [ ] = "shaders/fragmentShader.fragmentshader"
- char WindowTitle [ ] = "Tetris"
- const char * caTiles = "resources/images/tiles_large.tga"
- const char * caBackground = "resources/images/wallpaper.tga"
- const char * caGamegrid = "resources/images/gamegrid.tga"
- const char * caPause = "resources/images/pause.tga"
- const char * caGameOver = "resources/images/gameOver.tga"
- const char * caControls = "resources/images/controls.tga"
- std::chrono::time_point< std::chrono::steady_clock > t_start
- std::chrono::time_point< std::chrono::steady_clock > t_collision
- int timerCollision
- bool bCollisionPiece = false
- int ** gameGrid
- int xPosInicial = (int)WIDTH_PosXInicial / 2 - 1
- int yPosInicial = HEIGHT_PosYInicial
- Peca * pPeca
- Peca * pNextpPeca
- Peca * pSavedpPeca
- GeradorPecas geraPecas
- int iGamePiece
- int iGameNextPiece
- int iSavedPiece = 0
- bool bAlteraPecaEmJogo = false
- bool bDropPeca = false
- bool bPause = false
- bool bGameOver = false
- bool bControls = true
- bool bMouse = false
- bool bRotateMouse = false
- double dXPosAnt = 135
- bool bFirstTime = false
- int newSizeVertex
- int newSizeTexture
- int iTexWidth
- int iTexHeight
- int iTexNumChannels
- unsigned char * ucaTexData
- int iPontuacao = 0
- int iNivelJogo = 0
- int iTotalLinhasEliminadasEmNível = 0
- unsigned int globalBack
- ISoundEngine * SoundEngine = createIrrKlangDevice()

- ISound * sound
- bool bPassagemNivel = false

  Variável de som para impedir que a limpeza de linhas toque quando se passa de nível.
- std::vector< GLfloat > g_vertex_buffer_data = {}

  Vértices da peça atual.
- std::vector< GLfloat > g_texture_buffer_data = {}

  Textura da peça atual.
- std::vector< GLfloat > g_vertex_buffer_dataTot = {}

  Vértices de todas as peças.
- std::vector< GLfloat > g_texture_buffer_dataTot = {}

  Texturas de todas as peças.
- std::vector< GLfloat > g_vertex_buffer_dataBack

  Vértices de background.
- std::vector< GLfloat > g_vertex_buffer_dataPause

  Vértices de Pause.
- std::vector< GLfloat > g_vertex_buffer_dataGameOver

  Vértices de Game Over.
- std::vector< GLfloat > g_vertex_buffer_dataControls

  Vértices de Controls.
- std::vector< GLfloat > g_texture_buffer_dataControls

  Textura de Controls.
- std::vector< GLfloat > g_texture_buffer_dataGameOver

  Textura de Game Over.
- std::vector< GLfloat > g_texture_buffer_dataBack

  Textura de background.
- std::vector< GLfloat > g_texture_buffer_dataPause

  Textura de Pause.
- std::vector< GLfloat > g_vertex_buffer_dataGrid

  Vértices da grelha de jogo.
- std::vector< GLfloat > g_texture_buffer_dataGrid

  Textura da grelha de jogo.
- std::vector< GLfloat > g_vertex_buffer_dataScoreNum = {}

  Vértices de todos os algarismos da pontuação.
- std::vector< GLfloat > g_texture_buffer_dataScoreNum = {}

  Texturas de todos os algarismos da pontuação.
- std::vector< GLfloat > g_vertex_buffer_dataLevelNum = {}

  Vértices de todos os algarismos do nível.
- std::vector< GLfloat > g_texture_buffer_dataLevelNum = {}

  Texturas de todos os algarismos do nível.
- std::vector< GLfloat > g_vertex_buffer_dataLinesNum = {}

  Vértices de todos os algarismos do nível.
- std::vector< GLfloat > g_texture_buffer_dataLinesNum = {}

  Texturas de todos os algarismos do nível.
- GLuint MVP

  Identificador de matriz MVP nos shaders.
- glm::mat4 Projection = glm::mat4(1.0f)
- glm::mat4 View = glm::mat4(1.0f)

5.13.1 Macro Definition Documentation

5.13.1.1 GLEW_STATIC

```
#define GLEW_STATIC
```

5.13.1.2 STB_IMAGE_IMPLEMENTATION

```
#define STB_IMAGE_IMPLEMENTATION
```

5.13.2 Function Documentation

5.13.2.1 atualizaCampoJogo()

```
void atualizaCampoJogo (
            int iLinha )
```

Atualiza matriz de inteiros, visando concordância com o observado no campo de jogo. Nesta função todas as linhas acima de iLinha, a linha a eliminar, serão substituidas pelas seguintes destas

5.13.2.2 atualizaNivelJogo()

```
void atualizaNivelJogo ( )
```

5.13.2.3 avaliaEliminacaoLinhas()

```
std::vector<int> avaliaEliminacaoLinhas (
            int ** gameGrid )
```

Verifica, na matriz de inteiros, linhas que apenas contenham 1's, ou seja, linhas que terão de ser eliminadas.

5.13.2.4 cleanupDataFromGPU()

```
void cleanupDataFromGPU ( )
```

5.13.2.5 desenhaAmbiente()

```
void desenhaAmbiente ( )
```

Função para desenhar todo o ambiente, sem instanciar peças (usado aquando da eliminação de linhas)

5.13.2.6 drawCurrentObject()

```
bool drawCurrentObject (
            Peca & pPeca )
```

5.13.2.7 drawLevel()

```
void drawLevel (
            int iLevel )
```

5.13.2.8 drawLines()

```
void drawLines (
            int iLines )
```

5.13.2.9 drawObjects()

```
void drawObjects (
            int iIdentificador )
```

Usar função comum para desenhar peças anteriormente jogadas, próxima peça e peça guardada. Estas são diferenciadas pelo identificador (argumento da função) Distingue entre o que desenhar na peça drawObjects:

iIdentificador = 1 => desenhar todas as peças anteriormente jogadas
iIdentificador = 2 => desenhar próxima peça a jogar
iIdentificador = 3 => desenhar peça guardada pelo utilizador
iIdentificador = 4 => desenhar a palavra "SCORE"
iIdentificador = 5 => desenhar números da pontuação
iIdentificador = 6 => desenhar a palavra "LEVEL"
iIdentificador = 7 => desenhar números do nível
iIdentificador = 8 => desenhar a palavra "LINES"
iIdentificador = 9 => desenhar números das linhas eliminadas
iIdentificador = 10 => desenhar a palavra "NEXT"
iIdentificador = 11 => desenhar a palavra "HOLD"
iIdentificador = 12 => desenhar background
iIdentificador = 13 => desenhar grelha de jogo
iIdentificador = 14 => desenhar ecra de pausa
iIdentificador = 15 => desenhar ecra de fim de jogo
iIdentificador = 16 => desenhar ecra de controlos

5.13.2.10 drawScore()

```
void drawScore (
            int iScore )
```

5.13.2.11 eliminaLinha()

```
void eliminaLinha (
            int iLinha )
```

Caso haja uma linha completa, esta será eliminada na matriz de inteiros. Esta função garante que o observado no campo de jogo é concordante com o ocorrido na matriz de inteiros

5.13.2.12 evaluatePieceCollision()

```
bool evaluatePieceCollision (
            Peca & pPeca )
```

5.13.2.13 incializaMatrizZero()

```
void incializaMatrizZero ( )
```

Inicializar matriz a zeros.

5.13.2.14 main()

```
int main (
            void  )
```

5.13.2.15 pontosPorLinhasEliminadas()

```
int pontosPorLinhasEliminadas (
            int iNumbLinhasEliminadas )
```

5.13.2.16 randNum()

```
int randNum ( )
```

Generates random number from 0 to 6 (7 pieces)

5.13.2.17 realVertexBufferPiece()

```
std::vector<GLfloat>* realVertexBufferPiece (
            Peca & pPeca )
```

5.13.2.18 registerUserInputs()

```
void registerUserInputs (
            Peca & pPeca )
```

Retains information of user inputs, regarding piece movement.

5.13.2.19 returnPeca()

```
Peca* returnPeca (
            GeradorPecas & geraPecas,
            int switchValue )
```

5.13.2.20 setMVP_And_UniqueLoads()

```
void setMVP_And_UniqueLoads ( )
```

5.13.2.21 somPassagemNivel()

```
void somPassagemNivel ( )
```

5.13.2.22 textureBufferNumber()

```
std::vector<GLfloat> textureBufferNumber (
            int switchValue )
```

5.13.2.23 textureBufferPiece()

```
std::vector<GLfloat> textureBufferPiece (
            Peca & pPeca,
            int switchValue )
```

5.13.2.24 textureBufferPosPiece()

```
std::vector<GLfloat> textureBufferPosPiece (
            Peca & pPeca,
            int switchValue )
```

5.13.2.25 transferDataToGPUMemory()

```
void transferDataToGPUMemory (
            Peca & pPeca,
            Peca & pNextPeca,
            Peca & pSavedPeca )
```

5.13.2.26 vertexBufferNumber()

```
std::vector<GLfloat> vertexBufferNumber (
            int switchValue )
```

5.13.2.27 vertexBufferPiece()

```
std::vector<GLfloat> vertexBufferPiece (
            Peca & pPeca,
            int switchValue )
```

5.13.3 Variable Documentation

5.13.3.1 bAlteraPecaEmJogo

```
bool bAlteraPecaEmJogo = false
```

5.13.3.2 bCollisionPiece

```
bool bCollisionPiece = false
```

5.13.3.3 bControls

```
bool bControls = true
```

5.13.3.4 bDropPeca

```
bool bDropPeca = false
```

5.13.3.5 bFirstTime

```
bool bFirstTime = false
```

5.13.3.6 bGameOver

```
bool bGameOver = false
```

5.13.3.7 bMouse

```
bool bMouse = false
```

5.13.3.8 bPassagemNivel

```
bool bPassagemNivel = false
```

Variável de som para impedir que a limpeza de linhas toque quando se passa de nível.

5.13.3.9 bPause

```
bool bPause = false
```

5.13.3.10 bRotateMouse

```
bool bRotateMouse = false
```

5.13.3.11 caBackground

```
const char* caBackground = "resources/images/wallpaper.tga"
```

5.13.3.12 caControls

```
const char* caControls = "resources/images/controls.tga"
```

5.13.3.13 caGamegrid

```
const char* caGamegrid = "resources/images/gamegrid.tga"
```

5.13.3.14 caGameOver

```
const char* caGameOver = "resources/images/gameOver.tga"
```

5.13.3.15 caPause

```
const char* caPause = "resources/images/pause.tga"
```

5.13.3.16 caTiles

```
const char* caTiles = "resources/images/tiles_large.tga"
```

5.13.3.17 dXPosAnt

```
double dXPosAnt = 135
```

5.13.3.18 fragmentShader

```
char fragmentShader[] = "shaders/fragmentShader.fragmentshader"
```

5.13.3.19 g_texture_buffer_data

```
std::vector<GLfloat> g_texture_buffer_data = {}
```

Textura da peça atual.

5.13.3.20 g_texture_buffer_dataBack

```
std::vector<GLfloat> g_texture_buffer_dataBack
```

Initial value:

```
= {
    0.0f,  1.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  0.0f,
}
```

Textura de background.

5.13.3.21 g_texture_buffer_dataControls

```
std::vector<GLfloat> g_texture_buffer_dataControls
```

Initial value:

```
= {
    0.0f,  1.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  0.0f,
}
```

Textura de Controls.

5.13.3.22 g_texture_buffer_dataGameOver

```
std::vector<GLfloat> g_texture_buffer_dataGameOver
```

Initial value:

```
= {
    0.0f,  1.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  0.0f,
}
```

Textura de Game Over.

5.13.3.23 g_texture_buffer_dataGrid

```
std::vector<GLfloat> g_texture_buffer_dataGrid
```

Initial value:

```
= {
    0.0f,  1.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  0.0f,
}
```

Textura da grelha de jogo.

5.13.3.24 g_texture_buffer_dataLevelNum

```
std::vector<GLfloat> g_texture_buffer_dataLevelNum = {}
```

Texturas de todos os algarismos do nível.

5.13.3.25 g_texture_buffer_dataLinesNum

```
std::vector<GLfloat> g_texture_buffer_dataLinesNum = {}
```

Texturas de todos os algarismos do nível.

5.13.3.26 g_texture_buffer_dataPause

```
std::vector<GLfloat> g_texture_buffer_dataPause
```

Initial value:

```
= {
    0.0f,  1.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  1.0f,
    0.0f,  0.0f,
    1.0f,  0.0f,
}
```

Textura de Pause.

5.13.3.27 g_texture_buffer_dataScoreNum

```
std::vector<GLfloat> g_texture_buffer_dataScoreNum = {}
```

Texturas de todos os algarismos da pontuação.

5.13.3.28 g_texture_buffer_dataTot

```
std::vector<GLfloat> g_texture_buffer_dataTot = {}
```

Texturas de todas as peças.

5.13.3.29 g_vertex_buffer_data

```
std::vector<GLfloat> g_vertex_buffer_data = {}
```

Vértices da peça atual.

5.13.3.30 g_vertex_buffer_dataBack

```
std::vector<GLfloat> g_vertex_buffer_dataBack
```

Initial value:

```
= {
    0.0f,  0.0f,   0.1f,
    14.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    14.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    14.0f, 20.0f,  0.1f,
}
```

Vértices de background.

5.13.3.31 g_vertex_buffer_dataControls

```
std::vector<GLfloat> g_vertex_buffer_dataControls
```

Initial value:

```
= {
    0.0f,  0.0f,   0.1f,
    14.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    14.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    14.0f, 20.0f,  0.1f,
}
```

Vértices de Controls.

5.13.3.32 g_vertex_buffer_dataGameOver

```
std::vector<GLfloat> g_vertex_buffer_dataGameOver
```

Initial value:

```
= {
    0.0f,  0.0f,   0.1f,
    14.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    14.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    14.0f, 20.0f,  0.1f,
}
```

Vértices de Game Over.

5.13.3.33 g_vertex_buffer_dataGrid

```
std::vector<GLfloat> g_vertex_buffer_dataGrid
```

Initial value:

```
= {
    0.0f,  0.0f,   0.1f,
    10.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    10.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    10.0f, 20.0f,  0.1f,
}
```

Vértices da grelha de jogo.

5.13.3.34 g_vertex_buffer_dataLevelNum

```
std::vector<GLfloat> g_vertex_buffer_dataLevelNum = {}
```

Vértices de todos os algarismos do nível.

5.13.3.35 g_vertex_buffer_dataLinesNum

```
std::vector<GLfloat> g_vertex_buffer_dataLinesNum = {}
```

Vértices de todos os algarismos do nível.

5.13.3.36 g_vertex_buffer_dataPause

```
std::vector<GLfloat> g_vertex_buffer_dataPause
```

Initial value:

```
= {
    0.0f,  0.0f,   0.1f,
    14.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    14.0f, 0.0f,   0.1f,
    0.0f,  20.0f,  0.1f,
    14.0f, 20.0f,  0.1f,
}
```

Vértices de Pause.

5.13.3.37 g_vertex_buffer_dataScoreNum

```
std::vector<GLfloat> g_vertex_buffer_dataScoreNum = {}
```

Vértices de todos os algarismos da pontuação.

5.13.3.38 g_vertex_buffer_dataTot

```
std::vector<GLfloat> g_vertex_buffer_dataTot = {}
```

Vértices de todas as peças.

5.13.3.39 gameGrid

```
int** gameGrid
```

5.13.3.40 geraPecas

```
GeradorPecas geraPecas
```

5.13.3.41 globalBack

```
unsigned int globalBack
```

5.13.3.42 HEIGHT

```
GLfloat HEIGHT = 20.f
```

5.13.3.43 HEIGHT_PosYInicial

```
GLfloat HEIGHT_PosYInicial = 18.f
```

5.13.3.44 iGameNextPiece

```
int iGameNextPiece
```

5.13.3.45 iGamePiece

```
int iGamePiece
```

5.13.3.46 iHeight

```
int const iHeight = 20
```

5.13.3.47 iNivelJogo

```
int iNivelJogo = 0
```

5.13.3.48 iPontuacao

```
int iPontuacao = 0
```

5.13.3.49 iSavedPiece

```
int iSavedPiece = 0
```

5.13.3.50 iTexHeight

```
int iTexHeight
```

5.13.3.51 iTexNumChannels

```
int iTexNumChannels
```

5.13.3.52 iTexWidth

```
int iTexWidth
```

5.13.3.53 iTotalLinhasEliminadasEmNível

```
int iTotalLinhasEliminadasEmNível = 0
```

5.13.3.54 iWidth

```
int const iWidth = 10
```

5.13.3.55 MVP

```
GLuint MVP
```

Identificador de matriz MVP nos shaders.

5.13.3.56 newSizeTexture

```
int newSizeTexture
```

5.13.3.57 newSizeVertex

```
int newSizeVertex
```

5.13.3.58 pNextpPeca

```
Peca* pNextpPeca
```

5.13.3.59 pPeca

```
Peca* pPeca
```

5.13.3.60 programID

```
GLuint programID
```

GLSL program from the shaders.

5.13.3.61 Projection

```
glm::mat4 Projection = glm::mat4(1.0f)
```

5.13.3.62 pSavedpPeca

```
Peca* pSavedpPeca
```

5.13.3.63 sound

```
ISound* sound
```

5.13.3.64 SoundEngine

```
ISoundEngine* SoundEngine = createIrrKlangDevice()
```

5.13.3.65 t_collision

```
std::chrono::time_point<std::chrono::steady_clock> t_collision
```

5.13.3.66 t_start

```
std::chrono::time_point<std::chrono::steady_clock> t_start
```

5.13.3.67 texturebuffer

```
GLuint texturebuffer
```

Texture buffer object (TBO)

5.13.3.68 texturebufferBackground

```
GLuint texturebufferBackground
```

5.13.3.69 texturebufferControls

```
GLuint texturebufferControls
```

5.13.3.70 texturebufferGameOver

```
GLuint texturebufferGameOver
```

5.13.3.71 texturebufferGrid

```
GLuint texturebufferGrid
```

5.13.3.72 texturebufferHold

```
GLuint texturebufferHold
```

5.13.3.73 texturebufferLevel

```
GLuint texturebufferLevel
```

5.13.3.74 texturebufferLevelNum

```
GLuint texturebufferLevelNum
```

5.13.3.75 texturebufferLines

```
GLuint texturebufferLines
```

5.13.3.76 texturebufferLinesNum

```
GLuint texturebufferLinesNum
```

5.13.3.77 texturebufferNext

```
GLuint texturebufferNext
```

5.13.3.78 texturebufferNextPiece

```
GLuint texturebufferNextPiece
```

5.13.3.79 texturebufferPause

```
GLuint texturebufferPause
```

5.13.3.80 texturebufferPosPiece

```
GLuint texturebufferPosPiece
```

5.13.3.81 texturebufferSavedPiece

```
GLuint texturebufferSavedPiece
```

5.13.3.82 texturebufferScore

```
GLuint texturebufferScore
```

5.13.3.83 texturebufferScoreNum

```
GLuint texturebufferScoreNum
```

5.13.3.84 texturebufferTot

```
GLuint texturebufferTot
```

5.13.3.85 TextureID

```
GLuint TextureID[4]
```

Texture array object (TAO)

5.13.3.86 timerCollision

```
int timerCollision
```

5.13.3.87 ucaTexData

```
unsigned char* ucaTexData
```

5.13.3.88 VertexArrayID

```
GLuint VertexArrayID
```

Vertex array object (VAO)

5.13.3.89 vertexbuffer

```
GLuint vertexbuffer
```

Vertex buffer object (VBO)

5.13.3.90 vertexbufferBackground

```
GLuint vertexbufferBackground
```

5.13.3.91 vertexbufferControls

```
GLuint vertexbufferControls
```

5.13.3.92 vertexbufferGameOver

```
GLuint vertexbufferGameOver
```

5.13.3.93 vertexbufferGrid

```
GLuint vertexbufferGrid
```

5.13.3.94 vertexbufferHold

```
GLuint vertexbufferHold
```

5.13.3.95 vertexbufferLevel

```
GLuint vertexbufferLevel
```

5.13.3.96 vertexbufferLevelNum

```
GLuint vertexbufferLevelNum
```

5.13.3.97 vertexbufferLines

```
GLuint vertexbufferLines
```

5.13.3.98 vertexbufferLinesNum

```
GLuint vertexbufferLinesNum
```

5.13.3.99 vertexbufferNext

```
GLuint vertexbufferNext
```

5.13.3.100 vertexbufferNextPiece

```
GLuint vertexbufferNextPiece
```

5.13.3.101 vertexbufferPause

```
GLuint vertexbufferPause
```

5.13.3.102 vertexbufferPosPiece

```
GLuint vertexbufferPosPiece
```

5.13.3.103 vertexbufferSavedPiece

```
GLuint vertexbufferSavedPiece
```

5.13.3.104 vertexbufferScore

```
GLuint vertexbufferScore
```

5.13.3.105 vertexbufferScoreNum

```
GLuint vertexbufferScoreNum
```

5.13.3.106 vertexbufferTot

```
GLuint vertexbufferTot
```

5.13.3.107 vertexShader

```
char vertexShader[] = "shaders/vertexShader.vertexshader"
```

5.13.3.108 View

```
glm::mat4 View = glm::mat4(1.0f)
```

5.13.3.109 WIDTH

```
GLfloat WIDTH = 14.f
```

5.13.3.110 WIDTH_PosXInicial

```
GLfloat WIDTH_PosXInicial = 10.f
```

5.13.3.111 window

```
GLFWwindow* window
```

5.13.3.112 WindowHeight

```
GLint WindowHeight = 600
```

5.13.3.113 WindowTitle

```
char WindowTitle[] = "Tetris"
```

5.13.3.114 WindowWidth

```
GLint WindowWidth = WIDTH / HEIGHT * WindowHeight
```

5.13.3.115 xPosInicial

```
int xPosInicial = (int)WIDTH_PosXInicial / 2 - 1
```

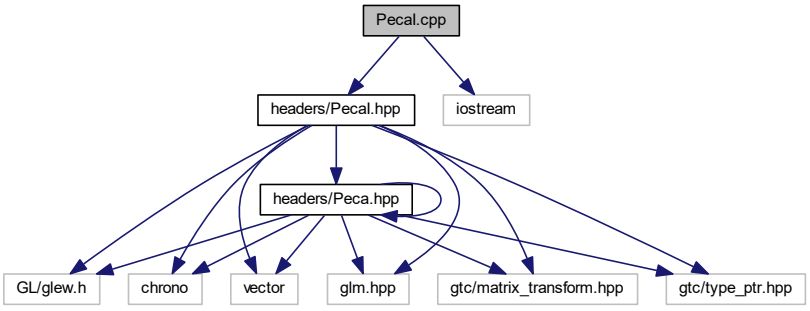
5.13.3.116 yPosInicial

```
int yPosInicial = HEIGHT_PosYInicial
```

5.14 Pecal.cpp File Reference

```
#include "headers/PecaI.hpp"
#include <iostream>
```

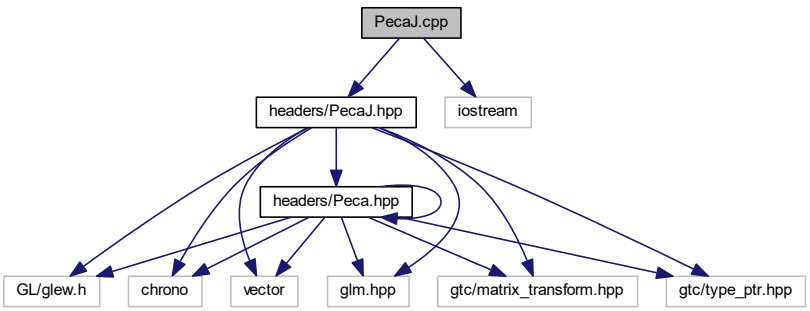
Include dependency graph for Pecal.cpp:



5.15 PecaJ.cpp File Reference

```
#include "headers/PecaJ.hpp"
#include <iostream>
```

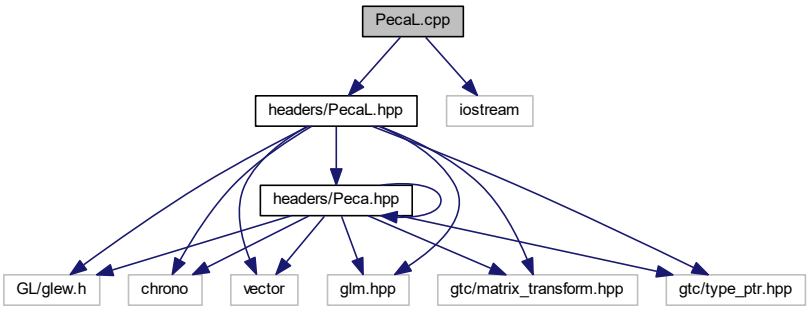
Include dependency graph for PecaJ.cpp:



5.16 PecaL.cpp File Reference

```
#include "headers/PecaL.hpp"
#include <iostream>
```

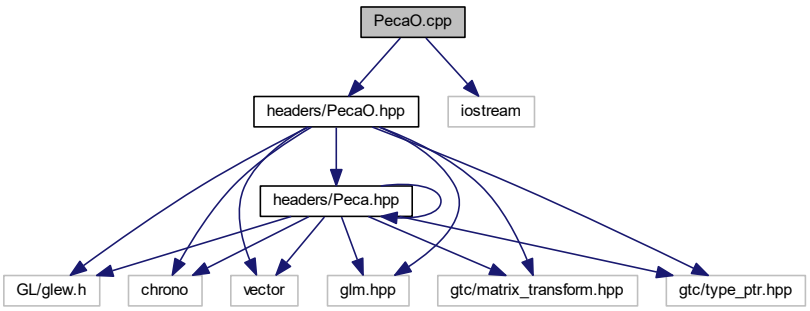
Include dependency graph for PecaL.cpp:



5.17 PecaO.cpp File Reference

```
#include "headers/PecaO.hpp"
#include <iostream>
```

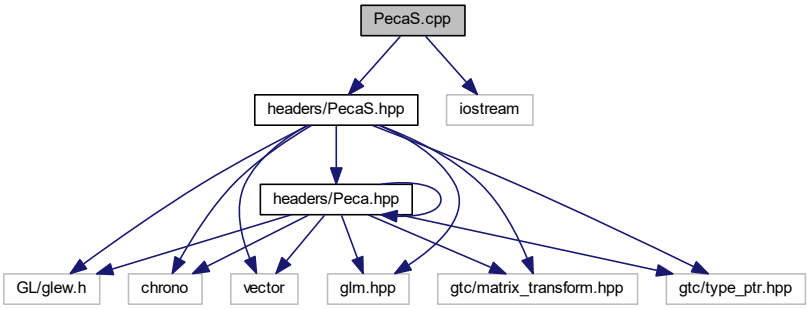
Include dependency graph for PecaO.cpp:



5.18 PecaS.cpp File Reference

```
#include "headers/PecaS.hpp"
#include <iostream>
```

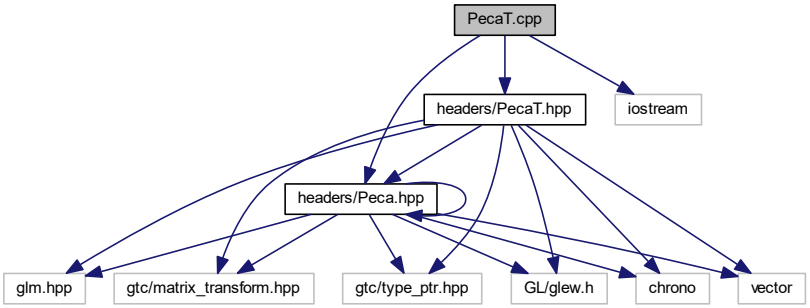
Include dependency graph for PecaS.cpp:



5.19 PecaT.cpp File Reference

```
#include "headers/PecaT.hpp"
#include "headers/Peca.hpp"
#include <iostream>
```

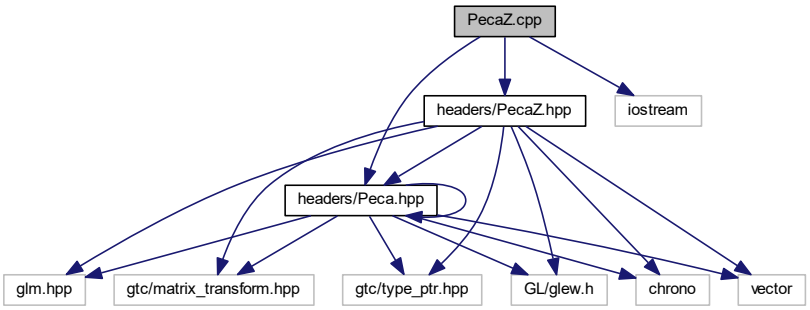
Include dependency graph for PecaT.cpp:



5.20 PecaZ.cpp File Reference

```
#include "headers/PecaZ.hpp"
#include "headers/Peca.hpp"
#include <iostream>
```

Include dependency graph for PecaZ.cpp:



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