# HelloWorld

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# Class Index

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# Chapter 3

# Class Documentation

## 3.1 AssetsManager Class Reference

A class which manages visual and sound assets.

`#include <AssetsManager.h>`

### Public Member Functions

- AssetsManager (void)

  *Constructor for the AssetsManager class.*
- void loadFont (std::string, std::string)

  *Method to load a font and insert it into the font map.*
- void loadTexture (std::string, std::string)

  *Method to load a texture and insert it into the texture map.*
- void loadSound (std::string, std::string)

  *Method to load a sound and insert it into the sound map. Automatically creates a corresponding sf::SoundBuffer.*
- void loadTrack (std::string, std::string)

  *Method to load a track (sf::Music) and insert it into the track map.*
- sf::Font * getFont (std::string)

  *Method to get font associated with given font key.*
- sf::Texture * getTexture (std::string)

  *Method to get texture associated with given texture key.*
- sf::SoundBuffer * getSoundBuffer (std::string)

  *Method to get soundbuffer associated with given sound key.*
- sf::Sound * getSound (std::string)

  *Method to get sound associated with given sound key.*
- void playTrack (void)

  *Method to play the current track.*
- void pauseTrack (void)

  *Method to pause the current track.*
- void stopTrack (void)

  *Method to stop the current track.*
- void nextTrack (void)

  *Method to advance to the next track. Wraps around if the end of the track map is reached.*

- void previousTrack (void)

  *Method to return to the previous track. Wraps around if the beginning of the track map is reached.*
- std::string getCurrentTrackKey (void)

  *Method to get track key for current track.*
- sf::SoundSource::Status getTrackStatus (void)

  *Method to get the status of the current track.*
- void clear (void)

  *Method to clear all loaded assets.*
- ~AssetsManager (void)

  *Destructor for the AssetsManager class.*

## Public Attributes

- std::map< std::string, sf::Font * > font_map

  *A map of pointers to loaded fonts.*
- std::map< std::string, sf::Texture * > texture_map

  *A map of pointers to loaded textures.*
- std::map< std::string, sf::SoundBuffer * > soundbuffer_map

  *A map of pointers to sound buffers.*
- std::map< std::string, sf::Sound * > sound_map

  *A map of pointers to loaded sounds.*
- std::map< std::string, sf::Music * >::iterator current_track

  *A map iterator which corresponds to the current track (i.e., the track currently being played).*
- std::map< std::string, sf::Music * > track_map

  *A map of pointers to opened tracks (i.e. sf::Music).*

## Private Member Functions

- void __loadSoundBuffer (std::string, std::string)

  *Helper method to load a soundbuffer and insert it into the soundbuffer map. Should only be called by loadSound(), to create an sf::SoundBuffer corresponding to the loaded sf::Sound.*

### 3.1.1 Detailed Description

A class which manages visual and sound assets.

### 3.1.2 Constructor & Destructor Documentation

#### 3.1.2.1 AssetsManager()

```
AssetsManager::AssetsManager (
            void  )
```

Constructor for the AssetsManager class.

```
110 {
111     //...
112
113     std::cout << "AssetsManager constructed at " << this << std::endl;
114
115     return;
116 }   /* AssetsManager() */
```

#### 3.1.2.2 ~AssetsManager()

```
AssetsManager::~AssetsManager (
            void  )
```

Destructor for the AssetsManager class.

```
739 {
740     this->clear();
741
742     std::cout « "AssetsManager at " « this « " destroyed" « std::endl;
743
744     return;
745 }   /* ~AssetsManager() */
```

### 3.1.3 Member Function Documentation

#### 3.1.3.1 __loadSoundBuffer()

```
void AssetsManager::__loadSoundBuffer (
            std::string path_2_sound,
            std::string sound_key )  [private]
```

Helper method to load a soundbuffer and insert it into the soundbuffer map. Should only be called by loadSound(), to create an sf::SoundBuffer corresponding to the loaded sf::Sound.

**Parameters**

| | |
|---|---|
| *path_2_sound* | A path (either relative or absolute) to the sound file. |
| *sound_key* | A key associated with the sound (for indexing into the soundbuffer map). |

```
47 {
48     //  1. check key, throw error if already in use
49     if (this->soundbuffer_map.count(sound_key) > 0) {
50         std::string error_str = "ERROR  AssetsManager::__loadSoundBuffer()  sound key ";
51         error_str += sound_key;
52         error_str += " is already in use";
53
54         this->clear();
55
56         #ifdef _WIN32
57             std::cout « error_str « std::endl;
58         #endif  /* _WIN32 */
59
60         throw std::runtime_error(error_str);
61     }
62
63
64     //  2. load from file, throw error on fail
65     sf::SoundBuffer* soundbuffer_ptr = new sf::SoundBuffer();
66
67     if (not soundbuffer_ptr->loadFromFile(path_2_sound)) {
68         std::string error_str = "ERROR  AssetsManager::__loadSoundBuffer()  could not load ";
69         error_str += "soundbuffer at ";
70         error_str += path_2_sound;
71
72         this->clear();
73
74         #ifdef _WIN32
75             std::cout « error_str « std::endl;
76         #endif  /* _WIN32 */
77
78         throw std::runtime_error(error_str);
79     }
80
81
```

```
82      //  3. insert into soundbuffer map
83      this->soundbuffer_map.insert(
84          std::pair<std::string, sf::SoundBuffer*>(sound_key, soundbuffer_ptr)
85      );
86
87      std::cout « "SoundBuffer " « sound_key « " inserted into soundbuffer map" «
88          std::endl;
89
90      return;
91  }   /* __loadSoundBuffer() */
```

#### 3.1.3.2 clear()

```
void AssetsManager::clear (
            void  )
```

Method to clear all loaded assets.

```
646 {
647     //  1. clear fonts
648     std::map<std::string, sf::Font*>::iterator font_iter;
649     for (
650         font_iter = this->font_map.begin();
651         font_iter != this->font_map.end();
652         font_iter++
653     ) {
654         delete font_iter->second;
655
656         std::cout « "Font " « font_iter->first « " deleted from font map" «
657             std::endl;
658     }
659     this->font_map.clear();
660
661
662     //  2. clear textures
663     std::map<std::string, sf::Texture*>::iterator texture_iter;
664     for (
665         texture_iter = this->texture_map.begin();
666         texture_iter != this->texture_map.end();
667         texture_iter++
668     ) {
669         delete texture_iter->second;
670
671         std::cout « "Texture " « texture_iter->first « " deleted from texture map" «
672             std::endl;
673     }
674     this->texture_map.clear();
675
676
677     //  3. clear sound buffers
678     std::map<std::string, sf::SoundBuffer*>::iterator soundbuffer_iter;
679     for (
680         soundbuffer_iter = this->soundbuffer_map.begin();
681         soundbuffer_iter != this->soundbuffer_map.end();
682         soundbuffer_iter++
683     ) {
684         delete soundbuffer_iter->second;
685
686         std::cout « "SoundBuffer " « soundbuffer_iter->first «
687             " deleted from soundbuffer map" « std::endl;
688     }
689     this->soundbuffer_map.clear();
690
691
692     //  4. clear sounds
693     std::map<std::string, sf::Sound*>::iterator sound_iter;
694     for (
695         sound_iter = this->sound_map.begin();
696         sound_iter != this->sound_map.end();
697         sound_iter++
698     ) {
699         sound_iter->second->stop();
700         delete sound_iter->second;
701
702         std::cout « "Sound " « sound_iter->first « " deleted from sound map" «
703             std::endl;
704     }
705     this->sound_map.clear();
706
```

```
707
708     //  5. clear tracks
709     std::map<std::string, sf::Music*>::iterator track_iter;
710     for (
711         track_iter = this->track_map.begin();
712         track_iter != this->track_map.end();
713         track_iter++
714     ) {
715         track_iter->second->stop();
716         delete track_iter->second;
717
718         std::cout « "Track " « track_iter->first « " deleted from track map" «
719             std::endl;
720     }
721     this->track_map.clear();
722
723     return;
724 }   /* clear() */
```

#### 3.1.3.3 getCurrentTrackKey()

```
std::string AssetsManager::getCurrentTrackKey (
             void  )
```

Method to get track key for current track.

**Returns**

The track key for the current track.

```
610 {
611     return this->current_track->first;
612 }   /* getCurrentTrackKey() */
```

#### 3.1.3.4 getFont()

```
sf::Font * AssetsManager::getFont (
             std::string font_key )
```

Method to get font associated with given font key.

**Parameters**

| | |
|---|---|
| *font_key* | A key associated with the font (for indexing into the font map). |

**Returns**

A pointer to the corresponding font.

```
351 {
352     //  1. check key, throw error if not found
353     if (this->font_map.count(font_key) <= 0) {
354         std::string error_str = "ERROR  AssetsManager::getFont()  font key ";
355         error_str += font_key;
356         error_str += " is not contained in font map";
357
358         this->clear();
359
360         #ifdef _WIN32
```

```
361             std::cout « error_str « std::endl;
362         #endif  /* _WIN32 */
363
364         throw std::runtime_error(error_str);
365     }
366
367     return this->font_map[font_key];
368 }   /* getFont() */
```

#### 3.1.3.5 getSound()

```
sf::Sound * AssetsManager::getSound (
            std::string sound_key )
```

Method to get sound associated with given sound key.

**Parameters**

| | |
|---|---|
| *sound_key* | A key associated with the sound (for indexing into the sound map). |

**Returns**

A pointer to the corresponding sound.

```
461 {
462     //  1. check key, throw error if not found
463     if (this->sound_map.count(sound_key) <= 0) {
464         std::string error_str = "ERROR  AssetsManager::getSound()  sound key ";
465         error_str += sound_key;
466         error_str += " is not contained in sound map";
467
468         this->clear();
469
470         #ifdef _WIN32
471             std::cout « error_str « std::endl;
472         #endif  /* _WIN32 */
473
474         throw std::runtime_error(error_str);
475     }
476
477     return this->sound_map[sound_key];
478 }   /* getSound() */
```

#### 3.1.3.6 getSoundBuffer()

```
sf::SoundBuffer * AssetsManager::getSoundBuffer (
            std::string sound_key )
```

Method to get soundbuffer associated with given sound key.

**Parameters**

| | |
|---|---|
| *sound_key* | A key associated with the soundbuffer (for indexing into the soundbuffer map). |

**Returns**

A pointer to the corresponding soundbuffer.

```
425 {
426     //  1. check key, throw error if not found
427     if (this->soundbuffer_map.count(sound_key) <= 0) {
428         std::string error_str = "ERROR  AssetsManager::getSoundBuffer()  sound key ";
429         error_str += sound_key;
430         error_str += " is not contained in soundbuffer map";
431 
432         this->clear();
433 
434         #ifdef _WIN32
435             std::cout << error_str << std::endl;
436         #endif  /* _WIN32 */
437 
438         throw std::runtime_error(error_str);
439     }
440 
441     return this->soundbuffer_map[sound_key];
442 }   /* getSoundBuffer() */
```

### 3.1.3.7 getTexture()

```
sf::Texture * AssetsManager::getTexture (
            std::string texture_key )
```

Method to get texture associated with given texture key.

**Parameters**

| | |
|---|---|
| *texture_key* | A key associated with the texture (for indexing into the texture map). |

**Returns**

A pointer to the corresponding texture.

```
388 {
389     //  1. check key, throw error if not found
390     if (this->texture_map.count(texture_key) <= 0) {
391         std::string error_str = "ERROR  AssetsManager::getTexture()  texture key ";
392         error_str += texture_key;
393         error_str += " is not contained in texture map";
394 
395         this->clear();
396 
397         #ifdef _WIN32
398             std::cout << error_str << std::endl;
399         #endif  /* _WIN32 */
400 
401         throw std::runtime_error(error_str);
402     }
403 
404     return this->texture_map[texture_key];
405 }   /* getTexture() */
```

### 3.1.3.8 getTrackStatus()

```
sf::SoundSource::Status AssetsManager::getTrackStatus (
            void  )
```

Method to get the status of the current track.

**Returns**

The status of the current track.

```
629 {
630     return this->current_track->second->getStatus();
631 }   /* getTrackStatus */
```

### 3.1.3.9 loadFont()

```
void AssetsManager::loadFont (
            std::string path_2_font,
            std::string font_key )
```

Method to load a font and insert it into the font map.

**Parameters**

| | |
|---|---|
| *path_2_font* | A path (either relative or absolute) to the font file. |
| *font_key* | A key associated with the font (for indexing into the font map). |

```
135 {
136     //  1. check key, throw error if already in use
137     if (this->font_map.count(font_key) > 0) {
138         std::string error_str = "ERROR  AssetsManager::loadFont()  font key ";
139         error_str += font_key;
140         error_str += " is already in use";
141 
142         this->clear();
143 
144         #ifdef _WIN32
145             std::cout « error_str « std::endl;
146         #endif  /* _WIN32 */
147 
148         throw std::runtime_error(error_str);
149     }
150 
151 
152     //  2. load from file, throw error on fail
153     sf::Font* font_ptr = new sf::Font();
154 
155     if (not font_ptr->loadFromFile(path_2_font)) {
156         std::string error_str = "ERROR  AssetsManager::loadFont()  could not load ";
157         error_str += "font at ";
158         error_str += path_2_font;
159 
160         this->clear();
161 
162         #ifdef _WIN32
163             std::cout « error_str « std::endl;
164         #endif  /* _WIN32 */
165 
166         throw std::runtime_error(error_str);
167     }
168 
169 
170     //  3. insert into font map
171     this->font_map.insert(std::pair<std::string, sf::Font*>(font_key, font_ptr));
172 
173     std::cout « "Font " « font_key « " inserted into font map" « std::endl;
174 
175     return;
176 }   /* loadFont() */
```

### 3.1.3.10 loadSound()

```
void AssetsManager::loadSound (
```

```
            std::string path_2_sound,
            std::string sound_key )
```

Method to load a sound and insert it into the sound map. Automatically creates a corresponding sf::SoundBuffer.

**Parameters**

| | |
|---|---|
| *path_2_sound* | A path (either relative or absolute) to the sound file. |
| *sound_key* | A key associated with the sound (for indexing into the sound map). |

```
259 {
260     //  1. create an associated sf::SoundBuffer
261     this->__loadSoundBuffer(path_2_sound, sound_key);
262 
263     //  2. associate sf::Sound with sf::SoundBuffer
264     sf::Sound* sound_ptr = new sf::Sound();
265     sound_ptr->setBuffer(*(this->soundbuffer_map[sound_key]));
266 
267     //  3. insert into sound map
268     this->sound_map.insert(std::pair<std::string, sf::Sound*>(sound_key, sound_ptr));
269 
270     std::cout « "Sound " « sound_key « " inserted into sound map" « std::endl;
271 
272     return;
273 }   /* loadSound() */
```

### 3.1.3.11 loadTexture()

```
void AssetsManager::loadTexture (
            std::string path_2_texture,
            std::string texture_key )
```

Method to load a texture and insert it into the texture map.

**Parameters**

| | |
|---|---|
| *path_2_texture* | A path (either relative or absolute) to the texture file. |
| *texture_key* | A key associated with the texture (for indexing into the texture map). |

```
196 {
197     //  1. check key, throw error if already in use
198     if (this->texture_map.count(texture_key) > 0) {
199         std::string error_str = "ERROR  AssetsManager::loadTexture()  texture key ";
200         error_str += texture_key;
201         error_str += " is already in use";
202 
203         this->clear();
204 
205         #ifdef _WIN32
206             std::cout « error_str « std::endl;
207         #endif  /* _WIN32 */
208 
209         throw std::runtime_error(error_str);
210     }
211 
212 
213     //  2. load from file, throw error on fail
214     sf::Texture* texture_ptr = new sf::Texture();
215 
216     if (not texture_ptr->loadFromFile(path_2_texture)) {
217         std::string error_str = "ERROR  AssetsManager::loadTexture()  could not load ";
218         error_str += "texture at ";
219         error_str += path_2_texture;
220 
221         this->clear();
222 
223         #ifdef _WIN32
224             std::cout « error_str « std::endl;
```

```
225         #endif  /* _WIN32 */
226
227         throw std::runtime_error(error_str);
228     }
229
230
231     //  3. insert into texture map
232     this->texture_map.insert(
233         std::pair<std::string, sf::Texture*>(texture_key, texture_ptr)
234     );
235
236     std::cout « "Texture " « texture_key « " inserted into texture map" « std::endl;
237
238     return;
239 }   /* loadTexture() */
```

#### 3.1.3.12 loadTrack()

```
void AssetsManager::loadTrack (
              std::string path_2_track,
              std::string track_key )
```

Method to load a track (sf::Music) and insert it into the track map.

**Parameters**

| | |
|---|---|
| *path_2_track* | A path (either relative or absolute) to the track file. |
| *track_key* | A key associated with the track (for indexing into the track map). |

```
292 {
293     //  1. check key, throw error if already in use
294     if (this->track_map.count(track_key) > 0) {
295         std::string error_str = "ERROR  AssetsManager::loadTrack()  track key ";
296         error_str += track_key;
297         error_str += " is already in use";
298
299         this->clear();
300
301         #ifdef _WIN32
302             std::cout « error_str « std::endl;
303         #endif  /* _WIN32 */
304
305         throw std::runtime_error(error_str);
306     }
307
308     //  2. open from file, throw error on fail
309     sf::Music* track_ptr = new sf::Music();
310
311     if (not track_ptr->openFromFile(path_2_track)) {
312         std::string error_str = "ERROR  AssetsManager::loadTrack()  could not open ";
313         error_str += "track at ";
314         error_str += path_2_track;
315
316         this->clear();
317
318         #ifdef _WIN32
319             std::cout « error_str « std::endl;
320         #endif  /* _WIN32 */
321
322         throw std::runtime_error(error_str);
323     }
324
325     //  3. insert into track map
326     this->track_map.insert(std::pair<std::string, sf::Music*>(track_key, track_ptr));
327     this->current_track = this->track_map.begin();
328
329     std::cout « "Track " « track_key « " inserted into track map" « std::endl;
330
331     return;
332 }   /* loadTrack() */
```

#### 3.1.3.13 nextTrack()

```
void AssetsManager::nextTrack (
            void  )
```

Method to advance to the next track. Wraps around if the end of the track map is reached.

```
551 {
552     //  1. stop current track
553     this->stopTrack();
554 
555     //  2. increment current track
556     this->current_track++;
557 
558     //  3. handle wrap around
559     if (this->current_track == this->track_map.end()) {
560         this->current_track = this->track_map.begin();
561     }
562 
563     return;
564 }   /* nextTrack() */
```

#### 3.1.3.14 pauseTrack()

```
void AssetsManager::pauseTrack (
            void  )
```

Method to pause the current track.

```
512 {
513     this->current_track->second->pause();
514 
515     return;
516 }   /* pauseTrack() */
```

#### 3.1.3.15 playTrack()

```
void AssetsManager::playTrack (
            void  )
```

Method to play the current track.

```
493 {
494     this->current_track->second->play();
495 
496     return;
497 }   /* playTrack() */
```

#### 3.1.3.16 previousTrack()

```
void AssetsManager::previousTrack (
            void  )
```

Method to return to the previous track. Wraps around if the beginning of the track map is reached.

```
580 {
581     //  1. stop current track
582     this->stopTrack();
583 
584     //  2. handle wrap around
585     if (this->current_track == this->track_map.begin()) {
586         this->current_track = this->track_map.end();
587     }
588 
589     //  3. decrement current track
590     this->current_track--;
591 
592     return;
593 }   /* previousTrack() */
```

#### 3.1.3.17 stopTrack()

```
void AssetsManager::stopTrack (
            void  )
```

Method to stop the current track.

```
531 {
532     this->current_track->second->stop();
533
534     return;
535 }   /* stopTrack() */
```

### 3.1.4 Member Data Documentation

#### 3.1.4.1 current_track

```
std::map<std::string, sf::Music*>::iterator AssetsManager::current_track
```

A map iterator which corresponds to the current track (i.e., the track currently being played).

#### 3.1.4.2 font_map

```
std::map<std::string, sf::Font*> AssetsManager::font_map
```

A map of pointers to loaded fonts.

#### 3.1.4.3 sound_map

```
std::map<std::string, sf::Sound*> AssetsManager::sound_map
```

A map of pointers to loaded sounds.

#### 3.1.4.4 soundbuffer_map

```
std::map<std::string, sf::SoundBuffer*> AssetsManager::soundbuffer_map
```

A map of pointers to sound buffers.

#### 3.1.4.5 texture_map

```
std::map<std::string, sf::Texture*> AssetsManager::texture_map
```

A map of pointers to loaded textures.

#### 3.1.4.6 track_map

```
std::map<std::string, sf::Music*> AssetsManager::track_map
```

A map of pointers to opened tracks (i.e. sf::Music).

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

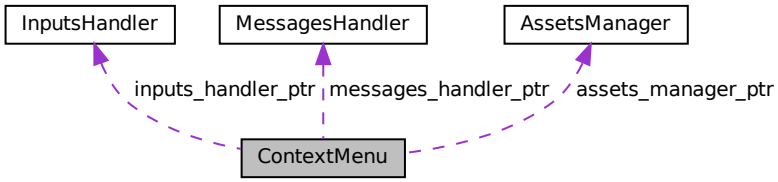
- header/ESC_core/AssetsManager.h
- source/ESC_core/AssetsManager.cpp

## 3.2 ContextMenu Class Reference

A class which defines a context menu for the game.

```
#include <ContextMenu.h>
```

Collaboration diagram for ContextMenu:




### Public Member Functions

- ContextMenu (AssetsManager ∗, InputsHandler ∗, MessagesHandler ∗, sf::RenderWindow ∗)

  *Constructor for the ContextMenu class.*
- void process (void)

  *Method to process ContextMenu. To be called once per frame.*
- void draw (void)

  *Method to draw the hex tile to the render window. To be called once per frame.*
- ∼ContextMenu (void)

  *Destructor for the ContextMenu class.*

## Public Attributes

- bool game_menu_up

  *Indicates whether or not the game menu is up.*
- int frame

  *The current frame of this object.*
- double position_x

  *The position of the object.*
- double position_y

  *The position of the object.*
- std::string console_message

  *The message to be printed to the console screen.*
- sf::RectangleShape menu_frame

  *The frame of the context menu.*
- sf::RectangleShape visual_screen

  *The context menu screen for visuals.*
- sf::ConvexShape visual_screen_frame_top

  *The top framing of the visual screen.*
- sf::ConvexShape visual_screen_frame_left

  *The left framing of the visual screen.*
- sf::ConvexShape visual_screen_frame_bottom

  *The bottom framing of the visual screen.*
- sf::ConvexShape visual_screen_frame_right

  *The right framing of the visual screen.*
- sf::RectangleShape console_screen

  *The context menu console screen (for animated text output).*
- sf::ConvexShape console_screen_frame_top

  *The top framing of the console screen.*
- sf::ConvexShape console_screen_frame_left

  *The left framing of the console screen.*
- sf::ConvexShape console_screen_frame_bottom

  *The bottom framing of the console screen.*
- sf::ConvexShape console_screen_frame_right

  *The right framing of the console screen.*

## Private Member Functions

- void __setUpMenuFrame (void)

  *Helper method to set up context menu frame (drawable).*
- void __setUpVisualScreen (void)

  *Helper method to set up context menu visual screen (drawable).*
- void __setUpVisualScreenFrame (void)

  *Helper method to set up framing for context menu visual screen (drawable).*
- void __drawVisualScreenFrame (void)

  *Helper method to draw visual screen frame.*
- void __setUpConsoleScreen (void)

  *Helper method to set up context menu console screen (drawable).*
- void __setUpConsoleScreenFrame (void)

  *Helper method to set up framing for context menu console screen (drawable).*
- void __drawConsoleScreenFrame (void)

  *Helper method to draw console screen frame.*
- void __drawConsoleText (void)

  *Helper method to draw animated text to context menu console screen.*

## Private Attributes

- AssetsManager * assets_manager_ptr

  *A pointer to the assets manager.*
- InputsHandler * inputs_handler_ptr

  *A pointer to the inputs handler.*
- MessagesHandler * messages_handler_ptr

  *A pointer to the messages handler.*
- sf::RenderWindow * render_window_ptr

  *A pointer to the render window.*

### 3.2.1 Detailed Description

A class which defines a context menu for the game.

### 3.2.2 Constructor & Destructor Documentation

#### 3.2.2.1 ContextMenu()

```
ContextMenu::ContextMenu (
            AssetsManager * assets_manager_ptr,
            InputsHandler * inputs_handler_ptr,
            MessagesHandler * messages_handler_ptr,
            sf::RenderWindow * render_window_ptr )
```

Constructor for the ContextMenu class.

**Parameters**

| | |
|---|---|
| *assets_manager_ptr* | Pointer to the assets manager. |
| *inputs_handler_ptr* | Pointer to the inputs handler. |
| *messages_handler_ptr* | Pointer to the messages handler. |
| *render_window_ptr* | Pointer to the render window. |

```
553 {
554     //  1. set attributes
555     this->assets_manager_ptr = assets_manager_ptr;
556     this->inputs_handler_ptr = inputs_handler_ptr;
557     this->messages_handler_ptr = messages_handler_ptr;
558     this->render_window_ptr = render_window_ptr;
559 
560     this->game_menu_up = false;
561 
562     this->frame = 0;
563 
564     this->position_x = GAME_WIDTH;
565     this->position_y = 0;
566 
567     this->console_message = "";
568 
569     //  2. set up and position drawable attributes
570     this->__setUpMenuFrame();
571     this->__setUpVisualScreen();
572     this->__setUpVisualScreenFrame();
573     this->__setUpConsoleScreen();
```

```
574     this->__setUpConsoleScreenFrame();
575
576     std::cout « "ContextMenu constructed at " « this « std::endl;
577
578     return;
579 }   /* ContextMenu() */
```

#### 3.2.2.2 ~ContextMenu()

```
ContextMenu::~ContextMenu (
            void  )
```

Destructor for the ContextMenu class.

```
693 {
694     std::cout « "ContextMenu at " « this « " destroyed" « std::endl;
695
696     return;
697 }   /* ~ContextMenu() */
```

### 3.2.3 Member Function Documentation

#### 3.2.3.1 __drawConsoleScreenFrame()

```
void ContextMenu::__drawConsoleScreenFrame (
            void  )  [private]
```

Helper method to draw console screen frame.

```
433 {
434     this->render_window_ptr->draw(this->console_screen_frame_top);
435     this->render_window_ptr->draw(this->console_screen_frame_left);
436     this->render_window_ptr->draw(this->console_screen_frame_bottom);
437     this->render_window_ptr->draw(this->console_screen_frame_right);
438
439     return;
440 }   /* __drawContextScreenFrame() */
```

#### 3.2.3.2 __drawConsoleText()

```
void ContextMenu::__drawConsoleText (
            void  )  [private]
```

Helper method to draw animated text to context menu console screen.

```
455 {
456     //  1. init console text
457     sf::Text console_text;
458
459     if (this->console_message.empty()) {
460
461         //              32 char x 16 line console "--------------------------------\n";
462         std::string console_string              = "  **** RTZ 64 CONTEXT V12 ****  \n";
463         console_string                         += "                                \n";
464         console_string                         += "64K RAM SYSTEM  38911 BYTES FREE\n";
465         console_string                         += "                                \n";
466         console_string                         += "[ESC]:             MENU         \n";
467         console_string                         += "[LEFT CLICK TILE]: TILE OPTIONS \n";
468         console_string                         += "                                \n";
```

```
469         console_string                          += "READY                           ";
470
471         console_text.setString(console_string);
472     }
473
474     else {
475
476         //              32 char x 16 line console "--------------------------------\n";
477         std::string console_string = this->console_message;
478         console_string                          += "\nFRAME: ";
479         console_string                          += std::to_string(this->frame);
480
481         console_text.setString(console_string);
482     }
483
484
485     //  2. set console text font, size, colour, and position
486     console_text.setFont(*(assets_manager_ptr->getFont("Glass_TTY_VT220")));
487     console_text.setCharacterSize(16);
488
489     console_text.setFillColor(MONOCHROME_TEXT_GREEN);
490
491     console_text.setPosition(
492         this->position_x - 50 - 300 + 16,
493         this->position_y + GAME_HEIGHT - 50 - 340 + 16
494     );
495
496
497     //  3. draw console text
498     this->render_window_ptr->draw(console_text);
499
500
501     //  4. assemble and draw blinking console cursor
502     if ((this->frame % FRAMES_PER_SECOND) > FRAMES_PER_SECOND / 2) {
503         sf::RectangleShape console_cursor(sf::Vector2f(10, 16));
504
505         console_cursor.setFillColor(MONOCHROME_TEXT_GREEN);
506
507         console_cursor.setPosition(
508             console_text.getPosition().x,
509             console_text.getPosition().y + console_text.getLocalBounds().height + 10
510         );
511
512         this->render_window_ptr->draw(console_cursor);
513     }
514
515     return;
516 }   /* __drawConsoleText() */
```

#### 3.2.3.3 __drawVisualScreenFrame()

```
void ContextMenu::__drawVisualScreenFrame (
            void  )  [private]
```

Helper method to draw visual screen frame.

```
208 {
209     this->render_window_ptr->draw(this->visual_screen_frame_top);
210     this->render_window_ptr->draw(this->visual_screen_frame_left);
211     this->render_window_ptr->draw(this->visual_screen_frame_bottom);
212     this->render_window_ptr->draw(this->visual_screen_frame_right);
213
214     return;
215 }   /* __drawVisualScreenFrame() */
```

#### 3.2.3.4 __setUpConsoleScreen()

```
void ContextMenu::__setUpConsoleScreen (
            void  )  [private]
```

Helper method to set up context menu console screen (drawable).

```
230 {
231     this->console_screen.setSize(sf::Vector2f(300, 340));
232     this->console_screen.setOrigin(300, 340);
233     this->console_screen.setPosition(
234         this->position_x - 50,
235         this->position_y + GAME_HEIGHT - 50
236     );
237     this->console_screen.setFillColor(MONOCHROME_SCREEN_BACKGROUND);
238 
239     return;
240 }   /* __setUpConsoleScreen() */
```

#### 3.2.3.5 __setUpConsoleScreenFrame()

```
void ContextMenu::__setUpConsoleScreenFrame (
            void  )  [private]
```

Helper method to set up framing for context menu console screen (drawable).

```
255 {
256     int n_points = 4;
257 
258     //  1. top framing
259     this->console_screen_frame_top.setPointCount(n_points);
260 
261     this->console_screen_frame_top.setPoint(
262         0,
263         sf::Vector2f(
264             this->position_x - 50,
265             this->position_y + GAME_HEIGHT - 50 - 340
266         )
267     );
268     this->console_screen_frame_top.setPoint(
269         1,
270         sf::Vector2f(
271             this->position_x - 50 + 16,
272             this->position_y + GAME_HEIGHT - 50 - 340 - 16
273         )
274     );
275     this->console_screen_frame_top.setPoint(
276         2,
277         sf::Vector2f(
278             this->position_x - 350 - 16,
279             this->position_y + GAME_HEIGHT - 50 - 340 - 16
280         )
281     );
282     this->console_screen_frame_top.setPoint(
283         3,
284         sf::Vector2f(
285             this->position_x - 350,
286             this->position_y + GAME_HEIGHT - 50 - 340
287         )
288     );
289 
290     this->console_screen_frame_top.setFillColor(VISUAL_SCREEN_FRAME_GREY);
291 
292     this->console_screen_frame_top.setOutlineThickness(2);
293     this->console_screen_frame_top.setOutlineColor(sf::Color(0, 0, 0, 255));
294 
295     this->console_screen_frame_top.move(0, -2);
296 
297 
298     //  2. left framing
299     this->console_screen_frame_left.setPointCount(n_points);
300 
301     this->console_screen_frame_left.setPoint(
302         0,
303         sf::Vector2f(
304             this->position_x - 350,
305             this->position_y + GAME_HEIGHT - 50 - 340
306         )
307     );
308     this->console_screen_frame_left.setPoint(
309         1,
310         sf::Vector2f(
311             this->position_x - 350 - 16,
312             this->position_y + GAME_HEIGHT - 50 - 340 - 16
313         )
```

```
314     );
315     this->console_screen_frame_left.setPoint(
316         2,
317         sf::Vector2f(
318             this->position_x - 350 - 16,
319             this->position_y + GAME_HEIGHT - 50 + 16
320         )
321     );
322     this->console_screen_frame_left.setPoint(
323         3,
324         sf::Vector2f(
325             this->position_x - 350,
326             this->position_y + GAME_HEIGHT - 50
327         )
328     );
329 
330     this->console_screen_frame_left.setFillColor(VISUAL_SCREEN_FRAME_GREY);
331 
332     this->console_screen_frame_left.setOutlineThickness(2);
333     this->console_screen_frame_left.setOutlineColor(sf::Color(0, 0, 0, 255));
334 
335     this->console_screen_frame_left.move(-2, 0);
336 
337 
338     //  3. bottom framing
339     this->console_screen_frame_bottom.setPointCount(n_points);
340 
341     this->console_screen_frame_bottom.setPoint(
342         0,
343         sf::Vector2f(
344             this->position_x - 350,
345             this->position_y + GAME_HEIGHT - 50
346         )
347     );
348     this->console_screen_frame_bottom.setPoint(
349         1,
350         sf::Vector2f(
351             this->position_x - 350 - 16,
352             this->position_y + GAME_HEIGHT - 50 + 16
353         )
354     );
355     this->console_screen_frame_bottom.setPoint(
356         2,
357         sf::Vector2f(
358             this->position_x - 50 + 16,
359             this->position_y + GAME_HEIGHT - 50 + 16
360         )
361     );
362     this->console_screen_frame_bottom.setPoint(
363         3,
364         sf::Vector2f(
365             this->position_x - 50,
366             this->position_y + GAME_HEIGHT - 50
367         )
368     );
369 
370     this->console_screen_frame_bottom.setFillColor(VISUAL_SCREEN_FRAME_GREY);
371 
372     this->console_screen_frame_bottom.setOutlineThickness(2);
373     this->console_screen_frame_bottom.setOutlineColor(sf::Color(0, 0, 0, 255));
374 
375     this->console_screen_frame_bottom.move(0, 2);
376 
377 
378     //  4. right framing
379     this->console_screen_frame_right.setPointCount(n_points);
380 
381     this->console_screen_frame_right.setPoint(
382         0,
383         sf::Vector2f(
384             this->position_x - 50,
385             this->position_y + GAME_HEIGHT - 50
386         )
387     );
388     this->console_screen_frame_right.setPoint(
389         1,
390         sf::Vector2f(
391             this->position_x - 50 + 16,
392             this->position_y + GAME_HEIGHT - 50 + 16
393         )
394     );
395     this->console_screen_frame_right.setPoint(
396         2,
397         sf::Vector2f(
398             this->position_x - 50 + 16,
399             this->position_y + GAME_HEIGHT - 50 - 340 - 16
400         )
```

```
401     );
402     this->console_screen_frame_right.setPoint(
403         3,
404         sf::Vector2f(
405             this->position_x - 50,
406             this->position_y + GAME_HEIGHT - 50 - 340
407         )
408     );
409
410     this->console_screen_frame_right.setFillColor(VISUAL_SCREEN_FRAME_GREY);
411
412     this->console_screen_frame_right.setOutlineThickness(2);
413     this->console_screen_frame_right.setOutlineColor(sf::Color(0, 0, 0, 255));
414
415     this->console_screen_frame_right.move(2, 0);
416
417     return;
418 }   /* __setUpConsoleScreenFrame() */
```

#### 3.2.3.6 __setUpMenuFrame()

```
void ContextMenu::__setUpMenuFrame (
            void  )  [private]
```

Helper method to set up context menu frame (drawable).

```
34 {
35     this->menu_frame.setSize(sf::Vector2f(400, GAME_HEIGHT));
36     this->menu_frame.setOrigin(400, 0);
37     this->menu_frame.setPosition(this->position_x, this->position_y);
38     this->menu_frame.setFillColor(MENU_FRAME_GREY);
39
40     return;
41 }   /* __setUpMenuFrame() */
```

#### 3.2.3.7 __setUpVisualScreen()

```
void ContextMenu::__setUpVisualScreen (
            void  )  [private]
```

Helper method to set up context menu visual screen (drawable).

```
56 {
57     this->visual_screen.setSize(sf::Vector2f(300, 300));
58     this->visual_screen.setOrigin(300, 0);
59     this->visual_screen.setPosition(this->position_x - 50, this->position_y + 50);
60     this->visual_screen.setFillColor(MONOCHROME_SCREEN_BACKGROUND);
61
62     return;
63 }   /* __setUpVisualScreen() */
```

#### 3.2.3.8 __setUpVisualScreenFrame()

```
void ContextMenu::__setUpVisualScreenFrame (
            void  )  [private]
```

Helper method to set up framing for context menu visual screen (drawable).

```
78 {
79     int n_points = 4;
80
81     //  1. top framing
82     this->visual_screen_frame_top.setPointCount(n_points);
```

```
83
84      this->visual_screen_frame_top.setPoint(
85          0,
86          sf::Vector2f(this->position_x - 50, this->position_y + 50)
87      );
88      this->visual_screen_frame_top.setPoint(
89          1,
90          sf::Vector2f(this->position_x - 50 + 16, this->position_y + 50 - 16)
91      );
92      this->visual_screen_frame_top.setPoint(
93          2,
94          sf::Vector2f(this->position_x - 350 - 16, this->position_y + 50 - 16)
95      );
96      this->visual_screen_frame_top.setPoint(
97          3,
98          sf::Vector2f(this->position_x - 350, this->position_y + 50)
99      );
100
101      this->visual_screen_frame_top.setFillColor(VISUAL_SCREEN_FRAME_GREY);
102
103      this->visual_screen_frame_top.setOutlineThickness(2);
104      this->visual_screen_frame_top.setOutlineColor(sf::Color(0, 0, 0, 255));
105
106      this->visual_screen_frame_top.move(0, -2);
107
108
109      //  2. left framing
110      this->visual_screen_frame_left.setPointCount(n_points);
111
112      this->visual_screen_frame_left.setPoint(
113          0,
114          sf::Vector2f(this->position_x - 350, this->position_y + 50)
115      );
116      this->visual_screen_frame_left.setPoint(
117          1,
118          sf::Vector2f(this->position_x - 350 - 16, this->position_y + 50 - 16)
119      );
120      this->visual_screen_frame_left.setPoint(
121          2,
122          sf::Vector2f(this->position_x - 350 - 16, this->position_y + 350 + 16)
123      );
124      this->visual_screen_frame_left.setPoint(
125          3,
126          sf::Vector2f(this->position_x - 350, this->position_y + 350)
127      );
128
129      this->visual_screen_frame_left.setFillColor(VISUAL_SCREEN_FRAME_GREY);
130
131      this->visual_screen_frame_left.setOutlineThickness(2);
132      this->visual_screen_frame_left.setOutlineColor(sf::Color(0, 0, 0, 255));
133
134      this->visual_screen_frame_left.move(-2, 0);
135
136
137      //  3. bottom framing
138      this->visual_screen_frame_bottom.setPointCount(n_points);
139
140      this->visual_screen_frame_bottom.setPoint(
141          0,
142          sf::Vector2f(this->position_x - 350, this->position_y + 350)
143      );
144      this->visual_screen_frame_bottom.setPoint(
145          1,
146          sf::Vector2f(this->position_x - 350 - 16, this->position_y + 350 + 16)
147      );
148      this->visual_screen_frame_bottom.setPoint(
149          2,
150          sf::Vector2f(this->position_x - 50 + 16, this->position_y + 350 + 16)
151      );
152      this->visual_screen_frame_bottom.setPoint(
153          3,
154          sf::Vector2f(this->position_x - 50, this->position_y + 350)
155      );
156
157      this->visual_screen_frame_bottom.setFillColor(VISUAL_SCREEN_FRAME_GREY);
158
159      this->visual_screen_frame_bottom.setOutlineThickness(2);
160      this->visual_screen_frame_bottom.setOutlineColor(sf::Color(0, 0, 0, 255));
161
162      this->visual_screen_frame_bottom.move(0, 2);
163
164
165      //  4. right framing
166      this->visual_screen_frame_right.setPointCount(n_points);
167
168      this->visual_screen_frame_right.setPoint(
169          0,
```

```
170         sf::Vector2f(this->position_x - 50, this->position_y + 350)
171     );
172     this->visual_screen_frame_right.setPoint(
173         1,
174         sf::Vector2f(this->position_x - 50 + 16, this->position_y + 350 + 16)
175     );
176     this->visual_screen_frame_right.setPoint(
177         2,
178         sf::Vector2f(this->position_x - 50 + 16, this->position_y + 50 - 16)
179     );
180     this->visual_screen_frame_right.setPoint(
181         3,
182         sf::Vector2f(this->position_x - 50, this->position_y + 50)
183     );
184 
185     this->visual_screen_frame_right.setFillColor(VISUAL_SCREEN_FRAME_GREY);
186 
187     this->visual_screen_frame_right.setOutlineThickness(2);
188     this->visual_screen_frame_right.setOutlineColor(sf::Color(0, 0, 0, 255));
189 
190     this->visual_screen_frame_right.move(2, 0);
191 
192     return;
193 }   /* __setUpVisualScreenFrame() */
```

#### 3.2.3.9 draw()

```
void ContextMenu::draw (
            void  )
```

Method to draw the hex tile to the render window. To be called once per frame.

```
663 {
664     //  1. menu frame
665     this->render_window_ptr->draw(this->menu_frame);
666 
667     //  2. visual screen
668     this->render_window_ptr->draw(this->visual_screen);
669     this->__drawVisualScreenFrame();
670 
671     //  3. console screen
672     this->render_window_ptr->draw(this->console_screen);
673     this->__drawConsoleScreenFrame();
674     this->__drawConsoleText();
675 
676     this->frame++;
677     return;
678 }   /* draw() */
```

#### 3.2.3.10 process()

```
void ContextMenu::process (
            void  )
```

Method to process ContextMenu. To be called once per frame.

```
602 {
603     //  1. handle inputs
604     if (this->inputs_handler_ptr->key_pressed_once_vec[sf::Keyboard::Escape]) {
605         if (not this->game_menu_up) {
606             this->game_menu_up = true;
607 
608             //              32 char x 16 line console "--------------------------------\n";
609             std::string game_menu_string            = "          **** MENU ****          \n";
610             game_menu_string                       += "                                  \n";
611             game_menu_string                       += "[T]:  TUTORIAL                    \n";
612             game_menu_string                       += "                                  \n";
613             game_menu_string                       += "[R]:  RESTART                     \n";
614             game_menu_string                       += "                                  \n";
615             game_menu_string                       += "                                  \n";
616             game_menu_string                       += "                                  \n";
```

```
617             game_menu_string                        += "                                \n";
618             game_menu_string                        += "                                \n";
619             game_menu_string                        += "                                \n";
620             game_menu_string                        += "                                \n";
621             game_menu_string                        += "                                \n";
622             game_menu_string                        += "[ESC]:  CLOSE MENU              \n";
623             game_menu_string                        += "[Q]:    QUIT                    \n";
624 
625 
626             this->console_message = game_menu_string;
627         }
628 
629         else {
630             this->game_menu_up = false;
631             this->console_message.clear();
632         }
633     }
634 
635     if (this->inputs_handler_ptr->key_pressed_once_vec[sf::Keyboard::Q]) {
636         if (this->game_menu_up) {
637             this->render_window_ptr->close();
638         }
639     }
640 
641     if (this->inputs_handler_ptr->mouse_right_click) {
642         this->game_menu_up = false;
643         this->console_message.clear();
644     }
645 
646     return;
647 }   /* process() */
```

## 3.2.4 Member Data Documentation

### 3.2.4.1 assets_manager_ptr

```
AssetsManager* ContextMenu::assets_manager_ptr  [private]
```

A pointer to the assets manager.

### 3.2.4.2 console_message

```
std::string ContextMenu::console_message
```

The message to be printed to the console screen.

### 3.2.4.3 console_screen

```
sf::RectangleShape ContextMenu::console_screen
```

The context menu console screen (for animated text output).

#### 3.2.4.4 console_screen_frame_bottom

```
sf::ConvexShape ContextMenu::console_screen_frame_bottom
```

The bottom framing of the console screen.

#### 3.2.4.5 console_screen_frame_left

```
sf::ConvexShape ContextMenu::console_screen_frame_left
```

The left framing of the console screen.

#### 3.2.4.6 console_screen_frame_right

```
sf::ConvexShape ContextMenu::console_screen_frame_right
```

The right framing of the console screen.

#### 3.2.4.7 console_screen_frame_top

```
sf::ConvexShape ContextMenu::console_screen_frame_top
```

The top framing of the console screen.

#### 3.2.4.8 frame

```
int ContextMenu::frame
```

The current frame of this object.

#### 3.2.4.9 game_menu_up

```
bool ContextMenu::game_menu_up
```

Indicates whether or not the game menu is up.

#### 3.2.4.10 inputs_handler_ptr

```
InputsHandler* ContextMenu::inputs_handler_ptr  [private]
```

A pointer to the inputs handler.

#### 3.2.4.11 menu_frame

```
sf::RectangleShape ContextMenu::menu_frame
```

The frame of the context menu.

#### 3.2.4.12 messages_handler_ptr

```
MessagesHandler* ContextMenu::messages_handler_ptr  [private]
```

A pointer to the messages handler.

#### 3.2.4.13 position_x

```
double ContextMenu::position_x
```

The position of the object.

#### 3.2.4.14 position_y

```
double ContextMenu::position_y
```

The position of the object.

#### 3.2.4.15 render_window_ptr

```
sf::RenderWindow* ContextMenu::render_window_ptr  [private]
```

A pointer to the render window.

#### 3.2.4.16 visual_screen

```
sf::RectangleShape ContextMenu::visual_screen
```

The context menu screen for visuals.

#### 3.2.4.17 visual_screen_frame_bottom

```
sf::ConvexShape ContextMenu::visual_screen_frame_bottom
```

The bottom framing of the visual screen.

#### 3.2.4.18 visual_screen_frame_left

```
sf::ConvexShape ContextMenu::visual_screen_frame_left
```

The left framing of the visual screen.

#### 3.2.4.19 visual_screen_frame_right

```
sf::ConvexShape ContextMenu::visual_screen_frame_right
```

The right framing of the visual screen.

#### 3.2.4.20 visual_screen_frame_top

```
sf::ConvexShape ContextMenu::visual_screen_frame_top
```

The top framing of the visual screen.

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

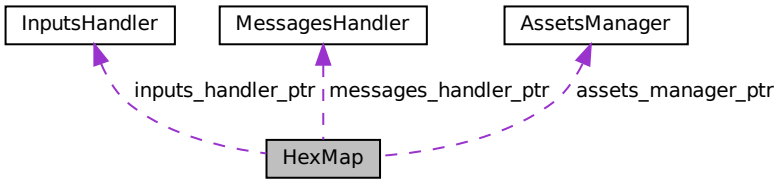
- header/ContextMenu/ContextMenu.h
- source/ContextMenu/ContextMenu.cpp

## 3.3 HexMap Class Reference

A class which defines a hex map of hex tiles.

`#include <HexMap.h>`

Collaboration diagram for HexMap:




### Public Member Functions

- HexMap (int, AssetsManager ∗, InputsHandler ∗, MessagesHandler ∗, sf::RenderWindow ∗)

  *Constructor for the HexMap class.*
- void assess (void)

  *Method to assess the resource of the selected tile.*
- void process (void)

  *Method to process HexMap. To be called once per frame.*
- void reroll (void)

  *Method to re-roll the hex map.*
- void toggleResourceOverlay (void)

  *Method to toggle the hex map resource overlay.*
- void draw (void)

  *Method to draw the hex map to the render window. To be called once per frame.*
- void clear (void)

  *Method to clear the hex map.*
- ∼HexMap (void)

  *Destructor for the HexMap class.*

### Public Attributes

- int n_layers

  *The number of layers in the hex map.*
- int n_tiles

  *The number of tiles in the hex map.*
- int frame

  *The current frame of this object.*
- double position_x

  *The x position of the hex map's origin (i.e. central) tile.*
- double position_y

*The y position of the hex map's origin (i.e. central) tile.*

- sf::RectangleShape glass_screen

  *To give the effect of an old glass screen over the hex map.*

- std::vector< double > tile_position_x_vec

  *A vector of tile x positions.*

- std::vector< double > tile_position_y_vec

  *A vector of tile y position.*

- std::vector< HexTile * > border_tiles_vec

  *A vector of pointers to the border tiles.*

- std::map< double, std::map< double, HexTile * > > hex_map

  *A position-indexed, nested map of hex tiles.*

## Private Member Functions

- void __setUpGlassScreen (void)
- void __layTiles (void)

  *Helper method to lay the hex tiles down to generate the game world.*

- std::vector< double > __getNoise (int, int=128)

  *Helper method to generate a vector of noise, with values mapped to the closed interval [0, 1]. Applies a random cosine series approach.*

- void __procedurallyGenerateTileTypes (void)

  *Helper method to procedurally generate tile types and set tiles accordingly.*

- std::vector< double > __getValidMapIndexPositions (double, double)

  *Helper method to translate given position into valid index position for a.*

- std::vector< HexTile * > __getNeighboursVector (HexTile *)

  *Helper method to assemble a vector pointers to all neighbours of the given tile.*

- TileType __getMajorityTileType (HexTile *)

  *Function to return majority tile type of a tile and its neighbours. If no clear majority, simply returns the type of the given tile.*

- void __smoothTileTypes (void)

  *Helper method to smooth tile types using a majority rules approach.*

- bool __isLakeTouchingOcean (HexTile *)
- void __enforceOceanContinuity (void)

  *Helper method to scan tiles and enforce ocean continuity. That is to say, if a lake tile is found to be in contact with an ocean tile, then it becomes ocean.*

- void __procedurallyGenerateTileResources (void)

  *Helper method to procedurally generate tile resources and set tiles accordingly.*

- void __assembleHexMap (void)

  *Helper method to assemble the hex map.*

- HexTile * __getSelectedTile (void)

  *Helper method to get pointer to selected tile.*

## Private Attributes

- AssetsManager * assets_manager_ptr

  *A pointer to the assets manager.*

- InputsHandler * inputs_handler_ptr

  *A pointer to the inputs handler.*

- MessagesHandler * messages_handler_ptr

  *A pointer to the messages handler.*

- sf::RenderWindow * render_window_ptr

  *A pointer to the render window.*

### 3.3.1 Detailed Description

A class which defines a hex map of hex tiles.

### 3.3.2 Constructor & Destructor Documentation

#### 3.3.2.1 HexMap()

```
HexMap::HexMap (
            int n_layers,
            AssetsManager * assets_manager_ptr,
            InputsHandler * inputs_handler_ptr,
            MessagesHandler * messages_handler_ptr,
            sf::RenderWindow * render_window_ptr )
```

Constructor for the HexMap class.

**Parameters**

| | |
|---|---|
| *n_layers* | The number of layers in the HexMap. |
| *assets_manager_ptr* | Pointer to the assets manager. |
| *inputs_handler_ptr* | Pointer to the inputs handler. |
| *messages_handler_ptr* | Pointer to the messages handler. |
| *render_window_ptr* | Pointer to the render window. |

```
865 {
866     //  1. set attributes
867     this->assets_manager_ptr = assets_manager_ptr;
868     this->inputs_handler_ptr = inputs_handler_ptr;
869     this->messages_handler_ptr = messages_handler_ptr;
870     this->render_window_ptr = render_window_ptr;
871
872     this->frame = 0;
873
874     this->n_layers = n_layers;
875     if (this->n_layers < 0) {
876         this->n_layers = 0;
877     }
878
879     this->position_x = 400;
880     this->position_y = 400;
881
882     //  2. assemble n layer hex map
883     this->__assembleHexMap();
884
885     //  3. set up and position drawable attributes
886     this->__setUpGlassScreen();
887
888     std::cout << "HexMap constructed at " << this << std::endl;
889
890     return;
891 }   /* HexMap() */
```

#### 3.3.2.2 ~HexMap()

```
HexMap::~HexMap (
            void  )
```

Destructor for the HexMap class.

```
1100 {
1101     this->clear();
1102 
1103     std::cout « "HexMap at " « this « " destroyed" « std::endl;
1104 
1105     return;
1106 }   /* ~HexMap() */
```

### 3.3.3 Member Function Documentation

#### 3.3.3.1 __assembleHexMap()

```
void HexMap::__assembleHexMap (
            void  )  [private]
```

Helper method to assemble the hex map.

```
756 {
757     //  1. seed RNG (using milliseconds since 1 Jan 1970)
758     unsigned long long int milliseconds_since_epoch =
759         std::chrono::duration_cast<std::chrono::milliseconds>(
760             std::chrono::system_clock::now().time_since_epoch()
761         ).count();
762     srand(milliseconds_since_epoch);
763 
764     //  2. lay tiles
765     this->__layTiles();
766 
767     //  3. procedurally generate types
768     this->__procedurallyGenerateTileTypes();
769 
770     //  4. procedurally generate resources
771     this->__procedurallyGenerateTileResources();
772 
773     return;
774 }   /* __assembleHexMap() */
```

#### 3.3.3.2 __enforceOceanContinuity()

```
void HexMap::__enforceOceanContinuity (
            void  )  [private]
```

Helper method to scan tiles and enforce ocean continuity. That is to say, if a lake tile is found to be in contact with an ocean tile, then it becomes ocean.

```
667 {
668     std::cout « "enforcing ocean continuity ..." « std::endl;
669 
670     bool tile_changed = false;
671 
672     //  1. scan tiles and enforce (where appropriate)
673     std::map<double, std::map<double, HexTile*»::iterator hex_map_iter_x;
674     std::map<double, HexTile*>::iterator hex_map_iter_y;
675     HexTile* hex_ptr;
676     for (
677         hex_map_iter_x = this->hex_map.begin();
678         hex_map_iter_x != this->hex_map.end();
679         hex_map_iter_x++
680     ) {
681         for (
682             hex_map_iter_y = hex_map_iter_x->second.begin();
683             hex_map_iter_y != hex_map_iter_x->second.end();
684             hex_map_iter_y++
685         ) {
686             hex_ptr = hex_map_iter_y->second;
687 
```

```
688             if (this->__isLakeTouchingOcean(hex_ptr)) {
689                 hex_ptr->setTileType(TileType :: OCEAN);
690                 tile_changed = true;
691             }
692         }
693     }
694
695     if (tile_changed) {
696         this->__enforceOceanContinuity();
697     }
698     else {
699         return;
700     }
701 }   /* __enforceOceanContinuity() */
```

#### 3.3.3.3 __getMajorityTileType()

```
TileType HexMap::__getMajorityTileType (
            HexTile * hex_ptr )  [private]
```

Function to return majority tile type of a tile and its neighbours. If no clear majority, simply returns the type of the given tile.

**Parameters**

| | |
|---|---|
| *hex_ptr* | Pointer to the given tile. |

**Returns**

The majority tile type of the tile and its neighbours. If no clear majority type, then the type of the given tile is simply returned.

```
523 {
524     //  1. init type count map
525     std::map<TileType, int> type_count_map;
526     type_count_map[hex_ptr->tile_type] = 1;
527
528     //  2. survey neighbours, count type instances
529     std::vector<HexTile*> neighbours_vec = this->__getNeighboursVector(hex_ptr);
530
531     for (size_t i = 0; i < neighbours_vec.size(); i++) {
532         if (type_count_map.count(neighbours_vec[i]->tile_type) <= 0) {
533             type_count_map[neighbours_vec[i]->tile_type] = 1;
534         }
535         else {
536             type_count_map[neighbours_vec[i]->tile_type] += 1;
537         }
538     }
539
540     //  3. find majority tile type
541     int max_count = -1 * std::numeric_limits<int>::infinity();
542     TileType majority_tile_type = hex_ptr->tile_type;
543
544     std::map<TileType, int>::iterator map_iter;
545     for (
546         map_iter = type_count_map.begin();
547         map_iter != type_count_map.end();
548         map_iter++
549     ){
550         if (map_iter->second > max_count) {
551             max_count = map_iter->second;
552             majority_tile_type = map_iter->first;
553         }
554     }
555
556     //  4. detect ties
557     for (
558         map_iter = type_count_map.begin();
559         map_iter != type_count_map.end();
560         map_iter++
561     ){
```

```
562         if (
563             map_iter->second == max_count and
564             map_iter->first != majority_tile_type
565         ) {
566             majority_tile_type = hex_ptr->tile_type;
567             break;
568         }
569     }
570
571     return majority_tile_type;
572 }   /* __getMajorityTileType() */
```

#### 3.3.3.4 __getNeighboursVector()

```
std::vector< HexTile * > HexMap::__getNeighboursVector (
            HexTile * hex_ptr )  [private]
```

Helper method to assemble a vector pointers to all neighbours of the given tile.

**Parameters**

| | |
|---|---|
| *hex_ptr* | A pointer to the given tile. |

**Returns**

A vector of pointers to all neighbours of the given tile.

```
465 {
466     std::vector<HexTile*> neighbours_vec;
467
468     //  1. build potential neighbour positions
469     std::vector<double> potential_neighbour_x_vec(6, 0);
470     std::vector<double> potential_neighbour_y_vec(6, 0);
471
472     for (int i = 0; i < 6; i++) {
473         potential_neighbour_x_vec[i] = hex_ptr->position_x +
474             2 * hex_ptr->minor_radius * cos((60 * i) * (M_PI / 180));
475
476         potential_neighbour_y_vec[i] = hex_ptr->position_y +
477             2 * hex_ptr->minor_radius * sin((60 * i) * (M_PI / 180));
478     }
479
480     //  2. populate neighbours vector
481     std::vector<double> map_index_positions;
482     double potential_x = 0;
483     double potential_y = 0;
484
485     for (int i = 0; i < 6; i++) {
486         potential_x = potential_neighbour_x_vec[i];
487         potential_y = potential_neighbour_y_vec[i];
488
489         map_index_positions = this->__getValidMapIndexPositions(
490             potential_x,
491             potential_y
492         );
493
494         if (not (map_index_positions[0] == -1)) {
495             neighbours_vec.push_back(
496                 this->hex_map[map_index_positions[0]][map_index_positions[1]]
497             );
498         }
499     }
500
501     return neighbours_vec;
502 }   /* __getNeighbourVector() */
```

#### 3.3.3.5 __getNoise()

```
std::vector< double > HexMap::__getNoise (
            int n_elements,
            int n_components = 128 )  [private]
```

Helper method to generate a vector of noise, with values mapped to the closed interval [0, 1]. Applies a random cosine series approach.

**Parameters**

| | |
|---|---|
| *n_elements* | The number of elements in the generated noise vector. |
| *n_components* | The number of components to use in the random cosine series. Defaults to 64. |

**Returns**

A vector of noise, with values mapped to the closed interval [0, 1].

```
245 {
246     //  1. generate random amplitude, wave number, direction, and phase vectors
247     std::vector<double> random_amplitude_vec(n_components, 0);
248     std::vector<double> random_wave_number_vec(n_components, 0);
249     std::vector<double> random_frequency_vec(n_components, 0);
250     std::vector<double> random_direction_vec(n_components, 0);
251     std::vector<double> random_phase_vec(n_components, 0);
252 
253     for (int i = 0; i < n_components; i++) {
254         random_amplitude_vec[i] = 10 * ((double)rand() / RAND_MAX);
255 
256         random_wave_number_vec[i] = 2 * M_PI * ((double)rand() / RAND_MAX);
257 
258         random_frequency_vec[i] = ((double)rand() / RAND_MAX);
259 
260         random_direction_vec[i] = 2 * M_PI * ((double)rand() / RAND_MAX);
261 
262         random_phase_vec[i] = 2 * M_PI * ((double)rand() / RAND_MAX);
263     }
264 
265     //  2. generate noise vec
266     double amp = 0;
267     double wave_no = 0;
268     double freq = 0;
269     double dir = 0;
270     double phase = 0;
271 
272     double x = 0;
273     double y = 0;
274     double t = time(NULL);
275 
276     double max_noise = -1 * std::numeric_limits<double>::infinity();
277     double min_noise = std::numeric_limits<double>::infinity();
278 
279     double noise = 0;
280     std::vector<double> noise_vec(n_elements, 0);
281 
282     for (int i = 0; i < n_elements; i++) {
283         x = this->tile_position_x_vec[i] - this->position_x;
284         y = this->tile_position_y_vec[i] - this->position_y;
285 
286         for (int j = 0; j < n_components; j++) {
287             amp = random_amplitude_vec[j];
288             wave_no = random_wave_number_vec[j];
289             freq = random_frequency_vec[j];
290             dir = random_direction_vec[j];
291             phase = random_phase_vec[j];
292 
293             noise += (amp / (j + 1)) * cos(
294                 wave_no * (j + 1) * (x * sin(dir) + y * cos(dir)) +
295                 2 * M_PI * (j + 1) * freq * t +
296                 phase
297             );
298         }
299 
300         noise_vec[i] = noise;
301 
302         if (noise > max_noise) {
```

```
303             max_noise = noise;
304         }
305
306         else if (noise < min_noise) {
307             min_noise = noise;
308         }
309
310         noise = 0;
311     }
312
313     //  3. normalize noise vec
314     for (int i = 0; i < n_elements; i++) {
315         noise_vec[i] = (noise_vec[i] - min_noise) / (max_noise - min_noise);
316
317         if (noise_vec[i] < 0) {
318             noise_vec[i] = 0;
319         }
320         else if (noise_vec[i] > 1) {
321             noise_vec[i] = 1;
322         }
323     }
324
325     return noise_vec;
326 }   /* __getNoise() */
```

### 3.3.3.6 __getSelectedTile()

```
HexTile * HexMap::__getSelectedTile (
            void  )  [private]
```

Helper method to get pointer to selected tile.

#### Returns

Pointer to selected tile (or NULL if no tile selected).

```
791 {
792     HexTile* selected_tile_ptr = NULL;
793
794     bool break_flag = false;
795     std::map<double, std::map<double, HexTile*»::iterator hex_map_iter_x;
796     std::map<double, HexTile*>::iterator hex_map_iter_y;
797
798     for (
799         hex_map_iter_x = this->hex_map.begin();
800         hex_map_iter_x != this->hex_map.end();
801         hex_map_iter_x++
802     ) {
803         for (
804             hex_map_iter_y = hex_map_iter_x->second.begin();
805             hex_map_iter_y != hex_map_iter_x->second.end();
806             hex_map_iter_y++
807         ) {
808             if (hex_map_iter_y->second->is_selected) {
809                 selected_tile_ptr = hex_map_iter_y->second;
810                 break_flag = true;
811             }
812
813             if (break_flag) {
814                 break;
815             }
816         }
817
818         if (break_flag) {
819             break;
820         }
821     }
822
823     return selected_tile_ptr;
824 }   /* __getSelectedTile() */
```

#### 3.3.3.7 __getValidMapIndexPositions()

```
std::vector< double > HexMap::__getValidMapIndexPositions (
            double potential_x,
            double potential_y )  [private]
```

Helper method to translate given position into valid index position for a.

**Parameters**

| | |
|---|---|
| *potential_x* | The potential x position of the tile. |
| *potential_y* | The potential y position of the tile. |

**Returns**

A vector of positions, either valid for indexing into the hex map, or sentinel values (-1) if invalid.

```
411 {
412     std::vector<double> map_index_positions = {-1, -1};
413 
414     std::map<double, std::map<double, HexTile*>>::iterator hex_map_iter_x;
415     std::map<double, HexTile*>::iterator hex_map_iter_y;
416     HexTile* hex_ptr;
417 
418     double distance = 0;
419 
420     for (
421         hex_map_iter_x = this->hex_map.begin();
422         hex_map_iter_x != this->hex_map.end();
423         hex_map_iter_x++
424     ) {
425         for (
426             hex_map_iter_y = hex_map_iter_x->second.begin();
427             hex_map_iter_y != hex_map_iter_x->second.end();
428             hex_map_iter_y++
429         ) {
430             hex_ptr = hex_map_iter_y->second;
431 
432             distance = sqrt(
433                 pow(hex_ptr->position_x - potential_x, 2) +
434                 pow(hex_ptr->position_y - potential_y, 2)
435             );
436 
437             if (distance <= hex_ptr->minor_radius / 4) {
438                 map_index_positions = {hex_ptr->position_x, hex_ptr->position_y};
439                 return map_index_positions;
440             }
441         }
442     }
443 
444     return map_index_positions;
445 }   /* __isInHexMap() */
```

#### 3.3.3.8 __isLakeTouchingOcean()

```
bool HexMap::__isLakeTouchingOcean (
            HexTile * hex_ptr )  [private]
634 {
635     //  1. if not lake tile, return
636     if (not (hex_ptr->tile_type == TileType :: LAKE)) {
637         return false;
638     }
639 
640     //  2. scan neighbours for ocean tiles
641     std::vector<HexTile*> neighbours_vec = this->__getNeighboursVector(hex_ptr);
```

```
642
643     for (size_t i = 0; i < neighbours_vec.size(); i++) {
644         if (neighbours_vec[i]->tile_type == TileType :: OCEAN) {
645             return true;
646         }
647     }
648
649     return false;
650 }   /* __isLakeTouchingOcean() */
```

#### 3.3.3.9 __layTiles()

```
void HexMap::__layTiles (
            void  )  [private]
```

Helper method to lay the hex tiles down to generate the game world.

```
52 {
53     this->n_tiles = 0;
54
55     //  1. add origin tile
56     HexTile* hex_ptr = new HexTile(
57         this->position_x,
58         this->position_y,
59         this->assets_manager_ptr,
60         this->inputs_handler_ptr,
61         this->messages_handler_ptr,
62         this->render_window_ptr
63     );
64
65     this->hex_map[hex_ptr->position_x][hex_ptr->position_y] = hex_ptr;
66     this->tile_position_x_vec.push_back(hex_ptr->position_x);
67     this->tile_position_y_vec.push_back(hex_ptr->position_y);
68     this->n_tiles++;
69
70
71     //  2. fill out first row (reflect across origin tile)
72     for (int i = 0; i < this->n_layers; i++) {
73         hex_ptr = new HexTile(
74             this->position_x + 2 * (i + 1) * hex_ptr->minor_radius,
75             this->position_y,
76             this->assets_manager_ptr,
77             this->inputs_handler_ptr,
78             this->messages_handler_ptr,
79             this->render_window_ptr
80         );
81
82         this->hex_map[hex_ptr->position_x][hex_ptr->position_y] = hex_ptr;
83         this->tile_position_x_vec.push_back(hex_ptr->position_x);
84         this->tile_position_y_vec.push_back(hex_ptr->position_y);
85         this->n_tiles++;
86
87         if (i == this->n_layers - 1) {
88             this->border_tiles_vec.push_back(hex_ptr);
89         }
90
91         hex_ptr = new HexTile(
92             this->position_x - 2 * (i + 1) * hex_ptr->minor_radius,
93             this->position_y,
94             this->assets_manager_ptr,
95             this->inputs_handler_ptr,
96             this->messages_handler_ptr,
97             this->render_window_ptr
98         );
99
100         this->hex_map[hex_ptr->position_x][hex_ptr->position_y] = hex_ptr;
101         this->tile_position_x_vec.push_back(hex_ptr->position_x);
102         this->tile_position_y_vec.push_back(hex_ptr->position_y);
103         this->n_tiles++;
104
105         if (i == this->n_layers - 1) {
106             this->border_tiles_vec.push_back(hex_ptr);
107         }
108     }
109
110
111     //  3. fill out subsequent rows (reflect across first row)
112     HexTile* first_row_left_tile = hex_ptr;
113
```

```
114     int offset_count = 1;
115
116     double x_offset = 0;
117     double y_offset = 0;
118
119     for (
120         int row_width = 2 * this->n_layers;
121         row_width > this->n_layers;
122         row_width--
123     ) {
124         //  3.1. upper row
125         x_offset = first_row_left_tile->position_x +
126             2 * offset_count * first_row_left_tile->minor_radius *
127             cos(60 * (M_PI / 180));
128
129         y_offset = first_row_left_tile->position_y -
130             2 * offset_count * first_row_left_tile->minor_radius *
131             sin(60 * (M_PI / 180));
132
133         hex_ptr = new HexTile(
134             x_offset,
135             y_offset,
136             this->assets_manager_ptr,
137             this->inputs_handler_ptr,
138             this->messages_handler_ptr,
139             this->render_window_ptr
140         );
141
142         this->hex_map[hex_ptr->position_x][hex_ptr->position_y] = hex_ptr;
143         this->tile_position_x_vec.push_back(hex_ptr->position_x);
144         this->tile_position_y_vec.push_back(hex_ptr->position_y);
145         this->n_tiles++;
146
147         this->border_tiles_vec.push_back(hex_ptr);
148
149         for (int i = 1; i < row_width; i++) {
150             x_offset += 2 * first_row_left_tile->minor_radius;
151
152             hex_ptr = new HexTile(
153                 x_offset,
154                 y_offset,
155                 this->assets_manager_ptr,
156                 this->inputs_handler_ptr,
157                 this->messages_handler_ptr,
158                 this->render_window_ptr
159             );
160
161             this->hex_map[hex_ptr->position_x][hex_ptr->position_y] = hex_ptr;
162             this->tile_position_x_vec.push_back(hex_ptr->position_x);
163             this->tile_position_y_vec.push_back(hex_ptr->position_y);
164             this->n_tiles++;
165
166             if (row_width == this->n_layers + 1 or i == row_width - 1) {
167                 this->border_tiles_vec.push_back(hex_ptr);
168             }
169         }
170
171         //  3.2. lower row
172         x_offset = first_row_left_tile->position_x +
173             2 * offset_count * first_row_left_tile->minor_radius *
174             cos(60 * (M_PI / 180));
175
176         y_offset = first_row_left_tile->position_y +
177             2 * offset_count * first_row_left_tile->minor_radius *
178             sin(60 * (M_PI / 180));
179
180         hex_ptr = new HexTile(
181             x_offset,
182             y_offset,
183             this->assets_manager_ptr,
184             this->inputs_handler_ptr,
185             this->messages_handler_ptr,
186             this->render_window_ptr
187         );
188
189         this->hex_map[hex_ptr->position_x][hex_ptr->position_y] = hex_ptr;
190         this->tile_position_x_vec.push_back(hex_ptr->position_x);
191         this->tile_position_y_vec.push_back(hex_ptr->position_y);
192         this->n_tiles++;
193
194         this->border_tiles_vec.push_back(hex_ptr);
195
196         for (int i = 1; i < row_width; i++) {
197             x_offset += 2 * first_row_left_tile->minor_radius;
198
199             hex_ptr = new HexTile(
200                 x_offset,
```

```
201                 y_offset,
202                 this->assets_manager_ptr,
203                 this->inputs_handler_ptr,
204                 this->messages_handler_ptr,
205                 this->render_window_ptr
206             );
207 
208             this->hex_map[hex_ptr->position_x][hex_ptr->position_y] = hex_ptr;
209             this->tile_position_x_vec.push_back(hex_ptr->position_x);
210             this->tile_position_y_vec.push_back(hex_ptr->position_y);
211             this->n_tiles++;
212 
213             if (row_width == this->n_layers + 1 or i == row_width - 1) {
214                 this->border_tiles_vec.push_back(hex_ptr);
215             }
216         }
217 
218         offset_count++;
219     }
220 
221     return;
222 }   /* __layTiles() */
```

#### 3.3.3.10 __procedurallyGenerateTileResources()

```
void HexMap::__procedurallyGenerateTileResources (
            void  )  [private]
```

Helper method to procedurally generate tile resources and set tiles accordingly.

```
716 {
717     //  1. get random cosine series noise vec
718     std::vector<double> noise_vec = this->__getNoise(this->n_tiles);
719 
720     //  2. set tile resources based on random cosine series noise
721     int noise_idx = 0;
722 
723     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
724     std::map<double, HexTile*>::iterator hex_map_iter_y;
725     for (
726         hex_map_iter_x = this->hex_map.begin();
727         hex_map_iter_x != this->hex_map.end();
728         hex_map_iter_x++
729     ) {
730         for (
731             hex_map_iter_y = hex_map_iter_x->second.begin();
732             hex_map_iter_y != hex_map_iter_x->second.end();
733             hex_map_iter_y++
734         ) {
735             hex_map_iter_y->second->setTileResource(noise_vec[noise_idx]);
736             noise_idx++;
737         }
738     }
739 
740     return;
741 }   /* __procedurallyGenerateTileResources() */
```

#### 3.3.3.11 __procedurallyGenerateTileTypes()

```
void HexMap::__procedurallyGenerateTileTypes (
            void  )  [private]
```

Helper method to procedurally generate tile types and set tiles accordingly.

```
341 {
342     //  1. get random cosine series noise vec
343     std::vector<double> noise_vec = this->__getNoise(this->n_tiles);
344 
345     //  2. set initial tile types based on either random cosine series noise or white
346     //     noise (decided by coin toss)
347     int noise_idx = 0;
```

```
348
349     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
350     std::map<double, HexTile*>::iterator hex_map_iter_y;
351     for (
352         hex_map_iter_x = this->hex_map.begin();
353         hex_map_iter_x != this->hex_map.end();
354         hex_map_iter_x++
355     ) {
356         for (
357             hex_map_iter_y = hex_map_iter_x->second.begin();
358             hex_map_iter_y != hex_map_iter_x->second.end();
359             hex_map_iter_y++
360         ) {
361             if ((double)rand() / RAND_MAX > 0.5) {
362                 hex_map_iter_y->second->setTileType(noise_vec[noise_idx]);
363             }
364             else {
365                 hex_map_iter_y->second->setTileType((double)rand() / RAND_MAX);
366             }
367             noise_idx++;
368         }
369     }
370
371     //  3. smooth tile types (majority rules)
372     this->__smoothTileTypes();
373
374     //  4. set border tile type to ocean
375     for (size_t i = 0; i < this->border_tiles_vec.size(); i++) {
376         this->border_tiles_vec[i]->setTileType(TileType :: OCEAN);
377     }
378
379     //  5. enforce ocean continuity (i.e. all lake tiles touching ocean become ocean)
380     this->__enforceOceanContinuity();
381
382     return;
383 }   /* __procedurallyGenerateTileTypes() */
```

#### 3.3.3.12 __setUpGlassScreen()

```
void HexMap::__setUpGlassScreen (
              void  )  [private]
32 {
33     this->glass_screen.setSize(sf::Vector2f(GAME_WIDTH, GAME_HEIGHT));
34     this->glass_screen.setFillColor(sf::Color(40, 40, 40, 40));
35
36     return;
37 }   /* __setUpGlassScreen() */
```

#### 3.3.3.13 __smoothTileTypes()

```
void HexMap::__smoothTileTypes (
              void  )  [private]
```

Helper method to smooth tile types using a majority rules approach.

```
587 {
588     std::cout « "smoothing ..." « std::endl;
589
590     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
591     std::map<double, HexTile*>::iterator hex_map_iter_y;
592     HexTile* hex_ptr;
593     TileType majority_tile_type;
594
595     for (
596         hex_map_iter_x = this->hex_map.begin();
597         hex_map_iter_x != this->hex_map.end();
598         hex_map_iter_x++
599     ) {
600         for (
601             hex_map_iter_y = hex_map_iter_x->second.begin();
602             hex_map_iter_y != hex_map_iter_x->second.end();
```

```
603             hex_map_iter_y++
604         ) {
605             hex_ptr = hex_map_iter_y->second;
606             majority_tile_type = this->__getMajorityTileType(hex_ptr);
607 
608             if (majority_tile_type != hex_ptr->tile_type) {
609                 hex_ptr->setTileType(majority_tile_type);
610             }
611         }
612     }
613 
614     return;
615 }   /* __smoothTileTypes() */
```

#### 3.3.3.14 assess()

```
void HexMap::assess (
             void  )
```

Method to assess the resource of the selected tile.

```
906 {
907     HexTile* selected_tile_ptr = this->__getSelectedTile();
908     if (selected_tile_ptr != NULL) {
909         selected_tile_ptr->assess();
910     }
911 
912     return;
913 }   /* assess() */
```

#### 3.3.3.15 clear()

```
void HexMap::clear (
             void  )
```

Method to clear the hex map.

```
1062 {
1063     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
1064     std::map<double, HexTile*>::iterator hex_map_iter_y;
1065     for (
1066         hex_map_iter_x = this->hex_map.begin();
1067         hex_map_iter_x != this->hex_map.end();
1068         hex_map_iter_x++
1069     ) {
1070         for (
1071             hex_map_iter_y = hex_map_iter_x->second.begin();
1072             hex_map_iter_y != hex_map_iter_x->second.end();
1073             hex_map_iter_y++
1074         ) {
1075             delete hex_map_iter_y->second;
1076         }
1077     }
1078     this->hex_map.clear();
1079 
1080     this->tile_position_x_vec.clear();
1081     this->tile_position_y_vec.clear();
1082     this->border_tiles_vec.clear();
1083 
1084     return;
1085 }   /* clear() */
```

#### 3.3.3.16 draw()

```
void HexMap::draw (
            void  )
```

Method to draw the hex map to the render window. To be called once per frame.

```
1018 {
1019     //  1. draw all tiles in order
1020     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
1021     std::map<double, HexTile*>::iterator hex_map_iter_y;
1022     for (
1023         hex_map_iter_x = this->hex_map.begin();
1024         hex_map_iter_x != this->hex_map.end();
1025         hex_map_iter_x++
1026     ) {
1027         for (
1028             hex_map_iter_y = hex_map_iter_x->second.begin();
1029             hex_map_iter_y != hex_map_iter_x->second.end();
1030             hex_map_iter_y++
1031         ) {
1032             hex_map_iter_y->second->draw();
1033         }
1034     }
1035
1036     //  2. redraw selected tile on top
1037     HexTile* selected_tile_ptr = this->__getSelectedTile();
1038     if (selected_tile_ptr != NULL) {
1039         selected_tile_ptr->draw();
1040     }
1041
1042     //  3. draw glass screen
1043     this->render_window_ptr->draw(this->glass_screen);
1044
1045     this->frame++;
1046     return;
1047 }   /* draw() */
```

#### 3.3.3.17 process()

```
void HexMap::process (
            void  )
```

Method to process HexMap. To be called once per frame.

```
928 {
929     //  1. handle inputs
930     //...
931
932     //  2. process tiles
933     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
934     std::map<double, HexTile*>::iterator hex_map_iter_y;
935     for (
936         hex_map_iter_x = this->hex_map.begin();
937         hex_map_iter_x != this->hex_map.end();
938         hex_map_iter_x++
939     ) {
940         for (
941             hex_map_iter_y = hex_map_iter_x->second.begin();
942             hex_map_iter_y != hex_map_iter_x->second.end();
943             hex_map_iter_y++
944         ) {
945             hex_map_iter_y->second->process();
946         }
947     }
948
949     return;
950 }   /* process() */
```

#### 3.3.3.18 reroll()

```
void HexMap::reroll (
            void  )
```

Method to re-roll the hex map.

```
965 {
966     this->clear();
967     this->__assembleHexMap();
968 
969     return;
970 }   /* reroll() */
```

#### 3.3.3.19 toggleResourceOverlay()

```
void HexMap::toggleResourceOverlay (
            void  )
```

Method to toggle the hex map resource overlay.

```
985 {
986     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
987     std::map<double, HexTile*>::iterator hex_map_iter_y;
988     for (
989         hex_map_iter_x = this->hex_map.begin();
990         hex_map_iter_x != this->hex_map.end();
991         hex_map_iter_x++
992     ) {
993         for (
994             hex_map_iter_y = hex_map_iter_x->second.begin();
995             hex_map_iter_y != hex_map_iter_x->second.end();
996             hex_map_iter_y++
997         ) {
998             hex_map_iter_y->second->toggleResourceOverlay();
999         }
1000     }
1001 
1002     return;
1003 }   /* toggleResourceOverlay() */
```

### 3.3.4 Member Data Documentation

#### 3.3.4.1 assets_manager_ptr

```
AssetsManager* HexMap::assets_manager_ptr  [private]
```

A pointer to the assets manager.

#### 3.3.4.2 border_tiles_vec

```
std::vector<HexTile*> HexMap::border_tiles_vec
```

A vector of pointers to the border tiles.

#### 3.3.4.3 frame

```
int HexMap::frame
```

The current frame of this object.

#### 3.3.4.4 glass_screen

```
sf::RectangleShape HexMap::glass_screen
```

To give the effect of an old glass screen over the hex map.

#### 3.3.4.5 hex_map

```
std::map<double, std::map<double, HexTile*> > HexMap::hex_map
```

A position-indexed, nested map of hex tiles.

#### 3.3.4.6 inputs_handler_ptr

```
InputsHandler* HexMap::inputs_handler_ptr  [private]
```

A pointer to the inputs handler.

#### 3.3.4.7 messages_handler_ptr

```
MessagesHandler* HexMap::messages_handler_ptr  [private]
```

A pointer to the messages handler.

#### 3.3.4.8 n_layers

```
int HexMap::n_layers
```

The number of layers in the hex map.

#### 3.3.4.9 n_tiles

```
int HexMap::n_tiles
```

The number of tiles in the hex map.

#### 3.3.4.10 position_x

```
double HexMap::position_x
```

The x position of the hex map's origin (i.e. central) tile.

#### 3.3.4.11 position_y

```
double HexMap::position_y
```

The y position of the hex map's origin (i.e. central) tile.

#### 3.3.4.12 render_window_ptr

```
sf::RenderWindow* HexMap::render_window_ptr  [private]
```

A pointer to the render window.

#### 3.3.4.13 tile_position_x_vec

```
std::vector<double> HexMap::tile_position_x_vec
```

A vector of tile x positions.

#### 3.3.4.14 tile_position_y_vec

```
std::vector<double> HexMap::tile_position_y_vec
```

A vector of tile y position.

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

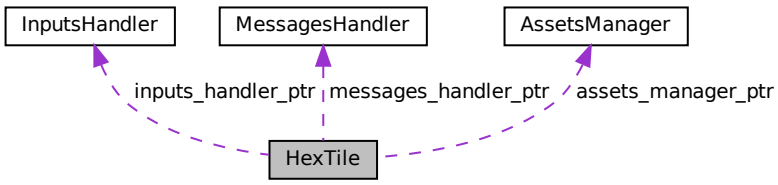
- header/HexMap/HexMap.h
- source/HexMap/HexMap.cpp

## 3.4 HexTile Class Reference

A class which defines a hex tile of the hex map.

`#include <HexTile.h>`

Collaboration diagram for HexTile:




### Public Member Functions

- HexTile (double, double, AssetsManager ∗, InputsHandler ∗, MessagesHandler ∗, sf::RenderWindow ∗)

  *Constructor for the HexTile class.*
- void setTileType (TileType)

  *Method to set the tile type (by enum value).*
- void setTileType (double)

  *Method to set the tile type (by numeric input).*
- void setTileResource (TileResource)

  *Method to set the tile resource (by enum value).*
- void setTileResource (double)

  *Method to set the tile resource (by numeric input).*
- void toggleResourceOverlay (void)

  *Method to toggle the tile resource overlay.*
- void assess (void)

  *Method to assess the tile's resource.*
- void process (void)

  *Method to process HexTile. To be called once per frame.*
- void draw (void)

  *Method to draw the hex tile to the render window. To be called once per frame.*
- ∼HexTile (void)

  *Destructor for the HexTile class.*

### Public Attributes

- TileType tile_type
- TileResource tile_resource
- bool show_node

  *A boolean which indicates whether or not to show the tile node.*
- bool show_resource

  *A boolean which indicates whether or not to show resource value.*

- bool resource_assessed

  *A boolean which indicates whether or not the resource has been assessed.*
- bool is_selected

  *A boolean which indicates whether or not the tile is selected.*
- int frame

  *The current frame of this object.*
- double position_x

  *The x position of the tile.*
- double position_y

  *The y position of the tile.*
- double major_radius

  *The radius of the smallest bounding circle.*
- double minor_radius

  *The radius of the largest inscribed circle.*
- sf::CircleShape node_sprite

  *A circle shape to mark the tile node.*
- sf::ConvexShape tile_sprite

  *A convex shape which represents the tile.*
- sf::ConvexShape select_outline_sprite

  *A convex shape which outlines the tile when selected.*
- sf::CircleShape resource_chip_sprite

  *A circle shape which represents a resource chip.*
- sf::Text resource_text

  *A text representation of the resource.*

## Private Member Functions

- void __setUpNodeSprite (void)

  *Helper method to set up node sprite.*
- void __setUpTileSprite (void)

  *Helper method to set up tile sprite.*
- void __setUpSelectOutlineSprite (void)

  *Helper method to set up select outline sprite.*
- void __setUpResourceChipSprite (void)

  *Helper method to set up resource chip sprite.*
- void __setResourceText (void)

  *Helper method to set up resource text.*
- bool __isClicked (void)

  *Helper method to determine if tile was clicked on.*

## Private Attributes

- AssetsManager * assets_manager_ptr

  *A pointer to the assets manager.*
- InputsHandler * inputs_handler_ptr

  *A pointer to the inputs handler.*
- MessagesHandler * messages_handler_ptr

  *A pointer to the messages handler.*
- sf::RenderWindow * render_window_ptr

  *A pointer to the render window.*

### 3.4.1 Detailed Description

A class which defines a hex tile of the hex map.

### 3.4.2 Constructor & Destructor Documentation

#### 3.4.2.1 HexTile()

```
HexTile::HexTile (
            double position_x,
            double position_y,
            AssetsManager * assets_manager_ptr,
            InputsHandler * inputs_handler_ptr,
            MessagesHandler * messages_handler_ptr,
            sf::RenderWindow * render_window_ptr )
```

Constructor for the HexTile class.

Ref: Wikipedia [2023]

**Parameters**

| | |
|---|---|
| *position_x* | The x position of the tile. |
| *position_y* | The y position of the tile. |
| *assets_manager_ptr* | Pointer to the assets manager. |
| *inputs_handler_ptr* | Pointer to the inputs handler. |
| *messages_handler_ptr* | Pointer to the messages handler. |
| *render_window_ptr* | Pointer to the render window. |

```
300 {
301     //  1. set attributes
302     this->assets_manager_ptr = assets_manager_ptr;
303     this->inputs_handler_ptr = inputs_handler_ptr;
304     this->messages_handler_ptr = messages_handler_ptr;
305     this->render_window_ptr = render_window_ptr;
306 
307     this->show_node = false;
308     this->show_resource = false;
309     this->resource_assessed = false;
310     this->is_selected = false;
311 
312     this->frame = 0;
313 
314     this->position_x = position_x;
315     this->position_y = position_y;
316 
317     this->major_radius = 32;
318     this->minor_radius = (sqrt(3) / 2) * this->major_radius;
319 
320     //  2. set up and position drawable attributes
321     this->__setUpNodeSprite();
322     this->__setUpTileSprite();
323     this->__setUpSelectOutlineSprite();
324     this->__setUpResourceChipSprite();
325     this->__setResourceText();
326 
327     //  3. set tile type and resource (default to forest and average)
328     this->setTileType(TileType :: FOREST);
329     this->setTileResource(TileResource :: AVERAGE);
330 
```

```
331     std::cout « "HexTile constructed at " « this « std::endl;
332
333     return;
334 }   /* HexTile() */
```

#### 3.4.2.2 ~HexTile()

```
HexTile::~HexTile (
            void  )
```

Destructor for the HexTile class.

```
657 {
658     std::cout « "HexTile at " « this « " destroyed" « std::endl;
659
660     return;
661 }   /* ~HexTile() */
```

### 3.4.3 Member Function Documentation

#### 3.4.3.1 __isClicked()

```
bool HexTile::__isClicked (
            void  )  [private]
```

Helper method to determine if tile was clicked on.

**Returns**

Boolean indicating whether or not tile was clicked on.

```
236 {
237     sf::Vector2i mouse_position = sf::Mouse::getPosition(*render_window_ptr);
238
239     double mouse_x = mouse_position.x;
240     double mouse_y = mouse_position.y;
241
242     double distance = sqrt(
243         pow(this->position_x - mouse_x, 2) +
244         pow(this->position_y - mouse_y, 2)
245     );
246
247     if (distance < this->minor_radius) {
248         return true;
249     }
250     else {
251         return false;
252     }
253 }   /* __isClicked() */
```

#### 3.4.3.2 __setResourceText()

```
void HexTile::__setResourceText (
            void  )  [private]
```

Helper method to set up resource text.

```
159 {
160     this->resource_text.setFont(*(assets_manager_ptr->getFont("DroidSansMono")));
161 
162     switch (this->tile_resource) {
163         case (TileResource :: POOR): {
164             this->resource_text.setString("-2");
165 
166             break;
167         }
168 
169         case (TileResource :: BELOW_AVERAGE): {
170             this->resource_text.setString("-1");
171 
172             break;
173         }
174 
175         case (TileResource :: AVERAGE): {
176             this->resource_text.setString("0");
177 
178             break;
179         }
180 
181         case (TileResource :: ABOVE_AVERAGE): {
182             this->resource_text.setString("+1");
183 
184             break;
185         }
186 
187         case (TileResource :: GOOD): {
188             this->resource_text.setString("+2");
189 
190             break;
191         }
192 
193         default: {
194             this->resource_text.setString("?");
195 
196             break;
197         }
198     }
199 
200     if (not this->resource_assessed) {
201         this->resource_text.setString("?");
202     }
203 
204     this->resource_text.setCharacterSize(16);
205 
206     this->resource_text.setOrigin(
207         this->resource_text.getLocalBounds().width / 2,
208         this->resource_text.getLocalBounds().height / 2
209     );
210 
211     this->resource_text.setFillColor(sf::Color(0, 0, 0, 255));
212 
213     this->resource_text.setPosition(
214         this->position_x,
215         this->position_y - 4
216     );
217 
218     return;
219 }   /* __setResourceText() */
```

#### 3.4.3.3 __setUpNodeSprite()

```
void HexTile::__setUpNodeSprite (
            void  )  [private]
```

Helper method to set up node sprite.

```
34 {
```

```
35      this->node_sprite.setRadius(4);
36
37      this->node_sprite.setOrigin(
38          this->node_sprite.getLocalBounds().width / 2,
39          this->node_sprite.getLocalBounds().height / 2
40      );
41
42      this->node_sprite.setPosition(this->position_x, this->position_y);
43
44      this->node_sprite.setFillColor(sf::Color(255, 0, 0, 255));
45
46      return;
47  }   /* __setUpNodeSprite() */
```

#### 3.4.3.4 __setUpResourceChipSprite()

```
void HexTile::__setUpResourceChipSprite (
              void  )  [private]
```

Helper method to set up resource chip sprite.

```
132 {
133     this->resource_chip_sprite.setRadius(2 * this->minor_radius / 3);
134
135     this->resource_chip_sprite.setOrigin(
136         this->resource_chip_sprite.getLocalBounds().width / 2,
137         this->resource_chip_sprite.getLocalBounds().height / 2
138     );
139
140     this->resource_chip_sprite.setPosition(this->position_x, this->position_y);
141
142     this->resource_chip_sprite.setFillColor(sf::Color(175, 175, 175, 175));
143
144     return;
145 }   /* __setUpResourceChip() */
```

#### 3.4.3.5 __setUpSelectOutlineSprite()

```
void HexTile::__setUpSelectOutlineSprite (
              void  )  [private]
```

Helper method to set up select outline sprite.

```
96 {
97      int n_points = 6;
98
99      this->select_outline_sprite.setPointCount(n_points);
100
101     for (int i = 0; i < n_points; i++) {
102         this->select_outline_sprite.setPoint(
103             i,
104             sf::Vector2f(
105                 this->position_x + this->major_radius * cos((30 + 60 * i) * (M_PI / 180)),
106                 this->position_y + this->major_radius * sin((30 + 60 * i) * (M_PI / 180))
107             )
108         );
109     }
110
111     this->select_outline_sprite.setOutlineThickness(4);
112     this->select_outline_sprite.setOutlineColor(sf::Color(255, 0, 0, 255));
113
114     this->select_outline_sprite.setFillColor(sf::Color(0, 0, 0, 0));
115
116     return;
117 }   /* __setUpSelectOutline() */
```

#### 3.4.3.6 __setUpTileSprite()

```
void HexTile::__setUpTileSprite (
            void  )  [private]
```

Helper method to set up tile sprite.

```
62 {
63     int n_points = 6;
64 
65     this->tile_sprite.setPointCount(n_points);
66 
67     for (int i = 0; i < n_points; i++) {
68         this->tile_sprite.setPoint(
69             i,
70             sf::Vector2f(
71                 this->position_x + this->major_radius * cos((30 + 60 * i) * (M_PI / 180)),
72                 this->position_y + this->major_radius * sin((30 + 60 * i) * (M_PI / 180))
73             )
74         );
75     }
76 
77     this->tile_sprite.setOutlineThickness(1);
78     this->tile_sprite.setOutlineColor(sf::Color(175, 175, 175, 255));
79 
80     return;
81 }   /* __setUpTileSprite() */
```

#### 3.4.3.7 assess()

```
void HexTile::assess (
            void  )
```

Method to assess the tile's resource.

```
555 {
556     this->resource_assessed = true;
557     this->__setResourceText();
558 
559     return;
560 }   /* assess() */
```

#### 3.4.3.8 draw()

```
void HexTile::draw (
            void  )
```

Method to draw the hex tile to the render window. To be called once per frame.

```
611 {
612     //  1. draw hex
613     this->render_window_ptr->draw(this->tile_sprite);
614 
615     //  2. draw node
616     if (this->show_node) {
617         this->render_window_ptr->draw(this->node_sprite);
618     }
619 
620     //  3. draw resource
621     if (this->show_resource) {
622         this->render_window_ptr->draw(this->resource_chip_sprite);
623         this->render_window_ptr->draw(this->resource_text);
624     }
625 
626     //  4. draw selection outline
627     if (this->is_selected) {
628         this->select_outline_sprite.setOutlineColor(
629             sf::Color(
630                 255,
```

```
631                 0,
632                 0,
633                 255 * pow(cos((M_PI * this->frame) / (1.5 * FRAMES_PER_SECOND)), 2)
634             )
635         );
636 
637         this->render_window_ptr->draw(this->select_outline_sprite);
638     }
639 
640     this->frame++;
641     return;
642 }   /* draw() */
```

#### 3.4.3.9 process()

```
void HexTile::process (
             void  )
```

Method to process HexTile. To be called once per frame.

```
575 {
576     //  1. handle inputs
577     if (inputs_handler_ptr->mouse_left_click) {
578         if (this->__isClicked()) {
579             std::cout « "Tile (" « this->position_x « ", " « this->position_y «
580                 ") was selected" « std::endl;
581 
582             this->is_selected = true;
583         }
584 
585         else {
586             this->is_selected = false;
587         }
588     }
589 
590     if (inputs_handler_ptr->mouse_right_click) {
591         this->is_selected = false;
592     }
593 
594     return;
595 }   /* process() */
```

#### 3.4.3.10 setTileResource() [1/2]

```
void HexTile::setTileResource (
             double input_value )
```

Method to set the tile resource (by numeric input).

**Parameters**

| | |
|---|---|
| *input_value* | A numerical input in the closed interval [0, 1]. |

```
480 {
481     //  1. check input
482     if (input_value < 0 or input_value > 1) {
483         std::string error_str = "ERROR  HexTile::setTileResource()  given input value is ";
484         error_str += "not in the closed interval [0, 1]";
485 
486         #ifdef _WIN32
487             std::cout « error_str « std::endl;
488         #endif  /* _WIN32 */
489 
490         throw std::runtime_error(error_str);
491     }
492 
```

```
493     //  2. convert input value to tile resource
494     TileResource tile_resource;
495 
496     if (input_value <= tile_resource_cumulative_probabilities[0]) {
497         tile_resource = TileResource :: POOR;
498     }
499     else if (input_value <= tile_resource_cumulative_probabilities[1]) {
500         tile_resource = TileResource :: BELOW_AVERAGE;
501     }
502     else if (input_value <= tile_resource_cumulative_probabilities[2]) {
503         tile_resource = TileResource :: AVERAGE;
504     }
505     else if (input_value <= tile_resource_cumulative_probabilities[3]) {
506         tile_resource = TileResource :: ABOVE_AVERAGE;
507     }
508     else {
509         tile_resource = TileResource :: GOOD;
510     }
511 
512     //  3. call alternate method
513     this->setTileResource(tile_resource);
514 
515     return;
516 }   /* setTileResource(double) */
```

#### 3.4.3.11 setTileResource() [2/2]

```
void HexTile::setTileResource (
             TileResource tile_resource )
```

Method to set the tile resource (by enum value).

**Parameters**

| | |
|---|---|
| *tile_resource* | The resource (TileResource) value to attribute to the tile. |

```
458 {
459     this->tile_resource = tile_resource;
460     this->__setResourceText();
461 
462     return;
463 }   /* setTileResource(TileResource) */
```

#### 3.4.3.12 setTileType() [1/2]

```
void HexTile::setTileType (
             double input_value )
```

Method to set the tile type (by numeric input).

**Parameters**

| | |
|---|---|
| *input_value* | A numerical input in the closed interval [0, 1]. |

```
408 {
409     //  1. check input
410     if (input_value < 0 or input_value > 1) {
411         std::string error_str = "ERROR  HexTile::setTileType()  given input value is ";
412         error_str += "not in the closed interval [0, 1]";
413 
414         #ifdef _WIN32
415             std::cout « error_str « std::endl;
```

```
416         #endif  /* _WIN32 */
417
418         throw std::runtime_error(error_str);
419     }
420
421     //  2. convert input value to tile type
422     TileType tile_type;
423
424     if (input_value <= tile_type_cumulative_probabilities[0]) {
425         tile_type = TileType :: LAKE;
426     }
427     else if (input_value <= tile_type_cumulative_probabilities[1]) {
428         tile_type = TileType :: PLAINS;
429     }
430     else if (input_value <= tile_type_cumulative_probabilities[2]) {
431         tile_type = TileType :: FOREST;
432     }
433     else {
434         tile_type = TileType :: MOUNTAINS;
435     }
436
437     //  3. call alternate method
438     this->setTileType(tile_type);
439
440     return;
441 }   /* setTileType(double) */
```

#### 3.4.3.13 setTileType() [2/2]

```
void HexTile::setTileType (
            TileType tile_type )
```

Method to set the tile type (by enum value).

**Parameters**

| | |
|---|---|
| *tile_type* | The type (TileType) to set the tile to. |

```
349 {
350     this->tile_type = tile_type;
351
352     switch (this->tile_type) {
353         case (TileType :: FOREST): {
354             this->tile_sprite.setFillColor(FOREST_GREEN);
355
356             break;
357         }
358
359         case (TileType :: LAKE): {
360             this->tile_sprite.setFillColor(LAKE_BLUE);
361
362             break;
363         }
364
365         case (TileType :: MOUNTAINS): {
366             this->tile_sprite.setFillColor(MOUNTAINS_GREY);
367
368             break;
369         }
370
371         case (TileType :: OCEAN): {
372             this->tile_sprite.setFillColor(OCEAN_BLUE);
373
374             break;
375         }
376
377         case (TileType :: PLAINS): {
378             this->tile_sprite.setFillColor(PLAINS_YELLOW);
379
380             break;
381         }
382
383         default: {
384             // do nothing!
385
```

```
386             break;
387         }
388     }
389
390     return;
391 }   /* setTileType(TileType) */
```

#### 3.4.3.14 toggleResourceOverlay()

```
void HexTile::toggleResourceOverlay (
             void  )
```

Method to toggle the tile resource overlay.

```
531 {
532     if (this->show_resource) {
533         this->show_resource = false;
534     }
535     else {
536         this->show_resource = true;
537     }
538
539     return;
540 }   /* toggleResourceOverlay() */
```

### 3.4.4 Member Data Documentation

#### 3.4.4.1 assets_manager_ptr

```
AssetsManager* HexTile::assets_manager_ptr  [private]
```

A pointer to the assets manager.

#### 3.4.4.2 frame

```
int HexTile::frame
```

The current frame of this object.

#### 3.4.4.3 inputs_handler_ptr

```
InputsHandler* HexTile::inputs_handler_ptr  [private]
```

A pointer to the inputs handler.

#### 3.4.4.4 is_selected

```
bool HexTile::is_selected
```

A boolean which indicates whether or not the tile is selected.

#### 3.4.4.5 major_radius

```
double HexTile::major_radius
```

The radius of the smallest bounding circle.

#### 3.4.4.6 messages_handler_ptr

```
MessagesHandler* HexTile::messages_handler_ptr  [private]
```

A pointer to the messages handler.

#### 3.4.4.7 minor_radius

```
double HexTile::minor_radius
```

The radius of the largest inscribed circle.

#### 3.4.4.8 node_sprite

```
sf::CircleShape HexTile::node_sprite
```

A circle shape to mark the tile node.

#### 3.4.4.9 position_x

```
double HexTile::position_x
```

The x position of the tile.

#### 3.4.4.10 position_y

```
double HexTile::position_y
```

The y position of the tile.

#### 3.4.4.11 render_window_ptr

```
sf::RenderWindow* HexTile::render_window_ptr  [private]
```

A pointer to the render window.

#### 3.4.4.12 resource_assessed

```
bool HexTile::resource_assessed
```

A boolean which indicates whether or not the resource has been assessed.

#### 3.4.4.13 resource_chip_sprite

```
sf::CircleShape HexTile::resource_chip_sprite
```

A circle shape which represents a resource chip.

#### 3.4.4.14 resource_text

```
sf::Text HexTile::resource_text
```

A text representation of the resource.

#### 3.4.4.15 select_outline_sprite

```
sf::ConvexShape HexTile::select_outline_sprite
```

A convex shape which outlines the tile when selected.

#### 3.4.4.16 show_node

```
bool HexTile::show_node
```

A boolean which indicates whether or not to show the tile node.

#### 3.4.4.17 show_resource

```
bool HexTile::show_resource
```

A boolean which indicates whether or not to show resource value.

#### 3.4.4.18 tile_resource

```
TileResource HexTile::tile_resource
```

#### 3.4.4.19 tile_sprite

```
sf::ConvexShape HexTile::tile_sprite
```

A convex shape which represents the tile.

#### 3.4.4.20 tile_type

```
TileType HexTile::tile_type
```

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

- header/HexMap/HexTile.h
- source/HexMap/HexTile.cpp

## 3.5 InputsHandler Class Reference

A class which handles inputs from peripherals (i.e., keyboard and mouse).

```
#include <InputsHandler.h>
```

## Public Member Functions

- InputsHandler (void)

  *Constructor for the InputsHandler class.*
- void process (sf::Event *)
- void printKeysPressed (void)

  *Method to print out which keys are currently pressed.*
- void reset (void)

  *Method to reset InputsHandler. To be called once per frame (at end of frame!).*
- ~InputsHandler (void)

  *Destructor for the InputsHandler class.*

## Public Attributes

- bool mouse_left_click

  *A boolean which indicates if the mouse left button has been clicked.*
- bool mouse_right_click

  *A boolean which indicates if the mouse right button has been clicked.*
- std::vector< bool > key_pressed_once_vec

  *A vector (bool) which indicates which keys have been pressed once. Useful for discrete inputs.*
- std::vector< bool > key_press_vec

  *A vector <bool> which indicates which keys are currently pressed. Useful for smooth movement.*
- std::map< sf::Keyboard::Key, std::string > key_code_map

  *A map from key codes to corresponding string representations.*

## Private Member Functions

- void __constructKeyCodeMap (void)

  *Helper method to construct a map from sf::Keyboard::Key to a string representation of the corresponding key.*

### 3.5.1 Detailed Description

A class which handles inputs from peripherals (i.e., keyboard and mouse).

### 3.5.2 Constructor & Destructor Documentation

#### 3.5.2.1 InputsHandler()

```
InputsHandler::InputsHandler (
            void  )
```

Constructor for the InputsHandler class.

```
379 {
380     this->key_pressed_once_vec.resize(sf::Keyboard::KeyCount, false);
381     this->key_press_vec.resize(sf::Keyboard::KeyCount, false);
382 
383     this->__constructKeyCodeMap();
384 
385     std::cout « "InputsHandler constructed at " « this « std::endl;
386 
387     return;
388 }   /* InputsHandler() */
```

#### 3.5.2.2 ~InputsHandler()

```
InputsHandler::~InputsHandler (
            void  )
```

Destructor for the InputsHandler class.

```
527 {
528     std::cout « "InputsHandler at " « this « " destroyed" « std::endl;
529
530     return;
531 }   /* ~InputsHandler() */
```

### 3.5.3 Member Function Documentation

#### 3.5.3.1 __constructKeyCodeMap()

```
void InputsHandler::__constructKeyCodeMap (
            void  )  [private]
```

Helper method to construct a map from sf::Keyboard::Key to a string representation of the corresponding key.

```
35 {
36     //  1. unknown keys
37     this->key_code_map.insert(
38         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Unknown, "Unknown")
39     );
40
41
42     //  2. alpha keys
43     this->key_code_map.insert(
44         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::A, "A")
45     );
46     this->key_code_map.insert(
47         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::B, "B")
48     );
49     this->key_code_map.insert(
50         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::C, "C")
51     );
52     this->key_code_map.insert(
53         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::D, "D")
54     );
55     this->key_code_map.insert(
56         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::E, "E")
57     );
58     this->key_code_map.insert(
59         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F, "F")
60     );
61     this->key_code_map.insert(
62         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::G, "G")
63     );
64     this->key_code_map.insert(
65         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::H, "H")
66     );
67     this->key_code_map.insert(
68         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::I, "I")
69     );
70     this->key_code_map.insert(
71         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::J, "J")
72     );
73     this->key_code_map.insert(
74         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::K, "K")
75     );
76     this->key_code_map.insert(
77         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::L, "L")
78     );
79     this->key_code_map.insert(
80         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::M, "M")
81     );
82     this->key_code_map.insert(
83         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::N, "N")
84     );
85     this->key_code_map.insert(
```

```
86          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::O, "O")
87      );
88      this->key_code_map.insert(
89          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::P, "P")
90      );
91      this->key_code_map.insert(
92          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Q, "Q")
93      );
94      this->key_code_map.insert(
95          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::R, "R")
96      );
97      this->key_code_map.insert(
98          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::S, "S")
99      );
100      this->key_code_map.insert(
101          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::T, "T")
102      );
103      this->key_code_map.insert(
104          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::U, "U")
105      );
106      this->key_code_map.insert(
107          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::V, "V")
108      );
109      this->key_code_map.insert(
110          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::W, "W")
111      );
112      this->key_code_map.insert(
113          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::X, "X")
114      );
115      this->key_code_map.insert(
116          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Y, "Y")
117      );
118      this->key_code_map.insert(
119          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Z, "Z")
120      );
121
122
123      //  3. numeric keys
124      this->key_code_map.insert(
125          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num0, "0")
126      );
127      this->key_code_map.insert(
128          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num1, "1")
129      );
130      this->key_code_map.insert(
131          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num2, "2")
132      );
133      this->key_code_map.insert(
134          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num3, "3")
135      );
136      this->key_code_map.insert(
137          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num4, "4")
138      );
139      this->key_code_map.insert(
140          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num5, "5")
141      );
142      this->key_code_map.insert(
143          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num6, "6")
144      );
145      this->key_code_map.insert(
146          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num7, "7")
147      );
148      this->key_code_map.insert(
149          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num8, "8")
150      );
151      this->key_code_map.insert(
152          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Num9, "9")
153      );
154      this->key_code_map.insert(
155          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad0, "0")
156      );
157      this->key_code_map.insert(
158          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad1, "1")
159      );
160      this->key_code_map.insert(
161          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad2, "2")
162      );
163      this->key_code_map.insert(
164          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad3, "3")
165      );
166      this->key_code_map.insert(
167          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad4, "4")
168      );
169      this->key_code_map.insert(
170          std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad5, "5")
171      );
172      this->key_code_map.insert(
```

```
173         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad6, "6")
174     );
175     this->key_code_map.insert(
176         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad7, "7")
177     );
178     this->key_code_map.insert(
179         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad8, "8")
180     );
181     this->key_code_map.insert(
182         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Numpad9, "9")
183     );
184
185
186     //  4. direction keys
187     this->key_code_map.insert(
188         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Left, "Left")
189     );
190     this->key_code_map.insert(
191         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Right, "Right")
192     );
193     this->key_code_map.insert(
194         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Up, "Up")
195     );
196     this->key_code_map.insert(
197         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Down, "Down")
198     );
199
200
201     //  5. function keys
202     this->key_code_map.insert(
203         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F1, "F1")
204     );
205     this->key_code_map.insert(
206         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F2, "F2")
207     );
208     this->key_code_map.insert(
209         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F3, "F3")
210     );
211     this->key_code_map.insert(
212         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F4, "F4")
213     );
214     this->key_code_map.insert(
215         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F5, "F5")
216     );
217     this->key_code_map.insert(
218         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F6, "F6")
219     );
220     this->key_code_map.insert(
221         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F7, "F7")
222     );
223     this->key_code_map.insert(
224         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F8, "F8")
225     );
226     this->key_code_map.insert(
227         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F9, "F9")
228     );
229     this->key_code_map.insert(
230         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F10, "F10")
231     );
232     this->key_code_map.insert(
233         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F11, "F11")
234     );
235     this->key_code_map.insert(
236         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F12, "F12")
237     );
238     this->key_code_map.insert(
239         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F13, "F13")
240     );
241     this->key_code_map.insert(
242         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F14, "F14")
243     );
244     this->key_code_map.insert(
245         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::F15, "F15")
246     );
247
248
249     //  6. other keys
250     this->key_code_map.insert(
251         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Escape, "Escape")
252     );
253     this->key_code_map.insert(
254         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::LControl, "LCtrl")
255     );
256     this->key_code_map.insert(
257         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::LShift, "LShift")
258     );
259     this->key_code_map.insert(
```

```
260         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::LAlt, "LAlt")
261     );
262     this->key_code_map.insert(
263         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::LSystem, "LSystem")
264     );
265     this->key_code_map.insert(
266         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::RControl, "RCtrl")
267     );
268     this->key_code_map.insert(
269         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::RShift, "RShift")
270     );
271     this->key_code_map.insert(
272         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::RAlt, "RAlt")
273     );
274     this->key_code_map.insert(
275         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::RSystem, "RSystem")
276     );
277     this->key_code_map.insert(
278         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Menu, "Menu")
279     );
280     this->key_code_map.insert(
281         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::LBracket, "LBracket")
282     );
283     this->key_code_map.insert(
284         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::RBracket, "RBracket")
285     );
286     this->key_code_map.insert(
287         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Semicolon, "Semicolon")
288     );
289     this->key_code_map.insert(
290         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Comma, "Comma")
291     );
292     this->key_code_map.insert(
293         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Period, "Period")
294     );
295     this->key_code_map.insert(
296         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Quote, "Quote")
297     );
298     this->key_code_map.insert(
299         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Slash, "Slash")
300     );
301     this->key_code_map.insert(
302         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Backslash, "Backslash")
303     );
304     this->key_code_map.insert(
305         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Tilde, "Tilde")
306     );
307     this->key_code_map.insert(
308         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Equal, "Equal")
309     );
310     this->key_code_map.insert(
311         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Hyphen, "Hyphen")
312     );
313     this->key_code_map.insert(
314         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Space, "Space")
315     );
316     this->key_code_map.insert(
317         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Enter, "Enter")
318     );
319     this->key_code_map.insert(
320         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Backspace, "Backspace")
321     );
322     this->key_code_map.insert(
323         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Tab, "Tab")
324     );
325     this->key_code_map.insert(
326         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::PageUp, "PageUp")
327     );
328     this->key_code_map.insert(
329         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::PageDown, "PageDown")
330     );
331     this->key_code_map.insert(
332         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::End, "End")
333     );
334     this->key_code_map.insert(
335         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Home, "Home")
336     );
337     this->key_code_map.insert(
338         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Insert, "Insert")
339     );
340     this->key_code_map.insert(
341         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Delete, "Delete")
342     );
343     this->key_code_map.insert(
344         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Add, "Add")
345     );
346     this->key_code_map.insert(
```

```
347         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Subtract, "Subtract")
348     );
349     this->key_code_map.insert(
350         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Multiply, "Multiply")
351     );
352     this->key_code_map.insert(
353         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Divide, "Divide")
354     );
355     this->key_code_map.insert(
356         std::pair<sf::Keyboard::Key, std::string>(sf::Keyboard::Pause, "Pause")
357     );
358
359     return;
360 }   /* __constructKeyCodeMap() */
```

#### 3.5.3.2 printKeysPressed()

```
void InputsHandler::printKeysPressed (
             void  )
```

Method to print out which keys are currently pressed.

```
473 {
474     std::string print_str = "";
475
476     for (size_t i = 0; i < this->key_press_vec.size(); i++) {
477         if (this->key_press_vec[i]) {
478             print_str += this->key_code_map[sf::Keyboard::Key(i)];
479             print_str += ", ";
480         }
481     }
482
483     if (not print_str.empty()) {
484         std::cout « "Keys pressed: " « print_str « std::endl;
485     }
486
487     return;
488 }   /* printKeysPressed() */
```

#### 3.5.3.3 process()

```
void InputsHandler::process (
            sf::Event * event_ptr )
405 {
406     //  1. update state of key press vectors
407     switch (event_ptr->type) {
408         case (sf::Event::KeyPressed): {
409             if (not this->key_press_vec[event_ptr->key.code]) {
410                 this->key_pressed_once_vec[event_ptr->key.code] = true;
411             }
412
413             this->key_press_vec[event_ptr->key.code] = true;
414
415             break;
416         }
417
418         case (sf::Event::KeyReleased): {
419             this->key_pressed_once_vec[event_ptr->key.code] = false;
420             this->key_press_vec[event_ptr->key.code] = false;
421
422             break;
423         }
424
425         case (sf::Event::MouseButtonPressed): {
426             if (sf::Mouse::isButtonPressed(sf::Mouse::Left))
427             {
428                 this->mouse_left_click = true;
429
430                 std::cout « "left click        " « std::endl;
431             }
432
```

```
433             if (sf::Mouse::isButtonPressed(sf::Mouse::Right))
434             {
435                 this->mouse_right_click = true;
436 
437                 std::cout « "right click        " « std::endl;
438             }
439 
440             break;
441         }
442 
443         case (sf::Event::MouseButtonReleased): {
444             this->mouse_left_click = false;
445             this->mouse_right_click = false;
446 
447             break;
448         }
449 
450         default: {
451             //  do nothing!
452 
453             break;
454         }
455     }
456 
457     return;
458 }   /* process() */
```

#### 3.5.3.4 reset()

```
void InputsHandler::reset (
              void  )
```

Method to reset InputsHandler. To be called once per frame (at end of frame!).

```
503 {
504     this->mouse_left_click = false;
505     this->mouse_right_click = false;
506 
507     for (size_t i = 0; i < this->key_press_vec.size(); i++) {
508         this->key_pressed_once_vec[i] = false;
509     }
510 
511     return;
512 }   /* reset() */
```

### 3.5.4 Member Data Documentation

#### 3.5.4.1 key_code_map

```
std::map<sf::Keyboard::Key, std::string> InputsHandler::key_code_map
```

A map from key codes to corresponding string representations.

#### 3.5.4.2 key_press_vec

```
std::vector<bool> InputsHandler::key_press_vec
```

A vector <bool> which indicates which keys are currently pressed. Useful for smooth movement.

#### 3.5.4.3 key_pressed_once_vec

```
std::vector<bool> InputsHandler::key_pressed_once_vec
```

A vector (bool) which indicates which keys have been pressed once. Useful for discrete inputs.

#### 3.5.4.4 mouse_left_click

```
bool InputsHandler::mouse_left_click
```

A boolean which indicates if the mouse left button has been clicked.

#### 3.5.4.5 mouse_right_click

```
bool InputsHandler::mouse_right_click
```

A boolean which indicates if the mouse right button has been clicked.

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

- header/ESC_core/InputsHandler.h
- source/ESC_core/InputsHandler.cpp

## 3.6 MessagesHandler Class Reference

A class which handles message traffic between game objects.

```
#include <MessagesHandler.h>
```

### Public Member Functions

- MessagesHandler (void)

  *Constructor for the MessagesHandler class.*
- void process (void)

  *Method to process messages. To be called once per frame.*
- ~MessagesHandler (void)

  *Destructor for the MessagesHandler class.*

### 3.6.1 Detailed Description

A class which handles message traffic between game objects.

## 3.6.2 Constructor & Destructor Documentation

### 3.6.2.1 MessagesHandler()

```
MessagesHandler::MessagesHandler (
            void  )
```

Constructor for the MessagesHandler class.

```
46 {
47     //...
48
49     std::cout « "MessagesHandler constructed at " « this « std::endl;
50
51     return;
52 }   /* MessagesHandler() */
```

### 3.6.2.2 ∼MessagesHandler()

```
MessagesHandler::∼MessagesHandler (
            void  )
```

Destructor for the MessagesHandler class.

```
86 {
87     std::cout « "MessagesHandler at " « this « " destroyed" « std::endl;
88
89     return;
90 }   /* ~MessagesHandler() */
```

## 3.6.3 Member Function Documentation

### 3.6.3.1 process()

```
void MessagesHandler::process (
            void  )
```

Method to process messages. To be called once per frame.

```
67 {
68     //...
69
70     return;
71 }   /* process() */
```

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

- header/ESC_core/MessagesHandler.h
- source/ESC_core/MessagesHandler.cpp

# Chapter 4

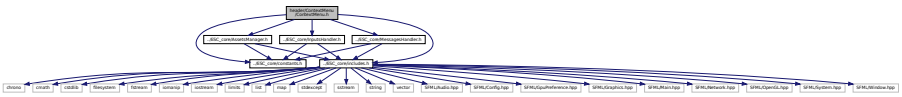
# File Documentation

## 4.1 header/ContextMenu/ContextMenu.h File Reference

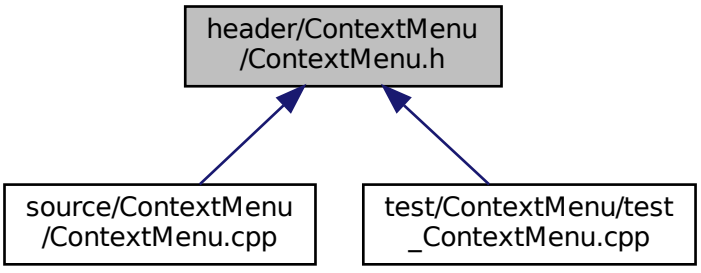
Header file for the ContextMenu class.

```
#include "../ESC_core/constants.h"
#include "../ESC_core/includes.h"
#include "../ESC_core/AssetsManager.h"
#include "../ESC_core/InputsHandler.h"
#include "../ESC_core/MessagesHandler.h"
```

Include dependency graph for ContextMenu.h:



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




### Classes

- class ContextMenu

  *A class which defines a context menu for the game.*

## Functions

- const sf::Color MENU_FRAME_GREY (185, 187, 182)

  *The base colour of the context menu frame.*
- const sf::Color MONOCHROME_SCREEN_BACKGROUND (40, 40, 40)

  *The base colour of old monochrome screens.*
- const sf::Color VISUAL_SCREEN_FRAME_GREY (151, 151, 143)

  *The base colour of the framing of the visual screen.*
- const sf::Color MONOCHROME_TEXT_GREEN (0, 255, 102)

  *The base colour of old monochrome text (green).*

### 4.1.1 Detailed Description

Header file for the ContextMenu class.

### 4.1.2 Function Documentation

#### 4.1.2.1 MENU_FRAME_GREY()

```
const sf::Color MENU_FRAME_GREY (
            185 ,
            187 ,
            182  )
```

The base colour of the context menu frame.

#### 4.1.2.2 MONOCHROME_SCREEN_BACKGROUND()

```
const sf::Color MONOCHROME_SCREEN_BACKGROUND (
            40 ,
            40 ,
            40  )
```

The base colour of old monochrome screens.

#### 4.1.2.3 MONOCHROME_TEXT_GREEN()

```
const sf::Color MONOCHROME_TEXT_GREEN (
            0 ,
            255 ,
            102  )
```

The base colour of old monochrome text (green).

#### 4.1.2.4 VISUAL_SCREEN_FRAME_GREY()

```
const sf::Color VISUAL_SCREEN_FRAME_GREY (
            151 ,
            151 ,
            143  )
```

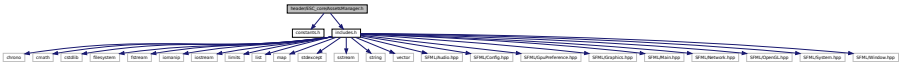
The base colour of the framing of the visual screen.

## 4.2 header/ESC_core/AssetsManager.h File Reference

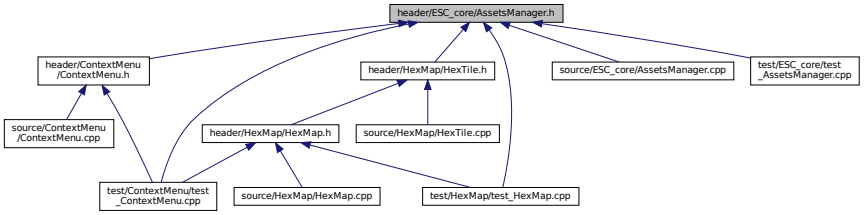
Header file for the AssetsManager class.

```
#include "constants.h"
#include "includes.h"
```

Include dependency graph for AssetsManager.h:



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




### Classes

- class AssetsManager

  *A class which manages visual and sound assets.*

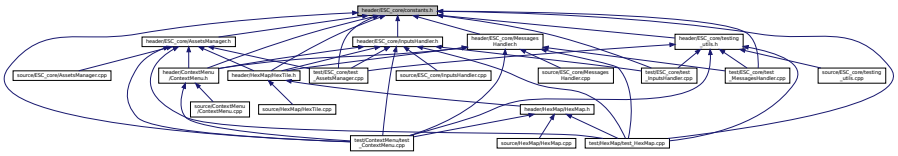
### 4.2.1 Detailed Description

Header file for the AssetsManager class.

## 4.3 header/ESC_core/constants.h File Reference

Header file for various constants.

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



### Variables

- const int FRAMES_PER_SECOND = 60

  *Target frames per second.*
- const double SECONDS_PER_FRAME = 1.0 / 60

  *Target seconds per frame (just reciprocal of target frames per second).*
- const int GAME_WIDTH = 1200

  *Width of the game space.*
- const int GAME_HEIGHT = 800

  *Height of the game space.*

### 4.3.1 Detailed Description

Header file for various constants.

### 4.3.2 Variable Documentation

#### 4.3.2.1 FRAMES_PER_SECOND

```
const int FRAMES_PER_SECOND = 60
```

Target frames per second.

#### 4.3.2.2 GAME_HEIGHT

```
const int GAME_HEIGHT = 800
```

Height of the game space.

#### 4.3.2.3 GAME_WIDTH

```
const int GAME_WIDTH = 1200
```

Width of the game space.

#### 4.3.2.4 SECONDS_PER_FRAME

```
const double SECONDS_PER_FRAME = 1.0 / 60
```

Target seconds per frame (just reciprocal of target frames per second).

## 4.4 header/ESC_core/doxygen_cite.h File Reference

Header file which simply cites the doxygen tool.

### 4.4.1 Detailed Description

Header file which simply cites the doxygen tool.

Ref: van Heesch. [2023]

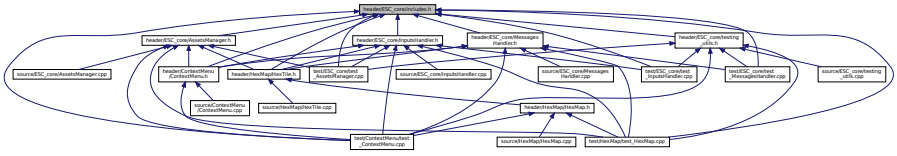
## 4.5 header/ESC_core/includes.h File Reference

Header file for various includes.

```
#include <chrono>
#include <cmath>
#include <cstdlib>
#include <filesystem>
#include <fstream>
#include <iomanip>
#include <iostream>
#include <limits>
#include <list>
#include <map>
#include <stdexcept>
#include <sstream>
#include <string>
#include <vector>
#include <SFML/Audio.hpp>
#include <SFML/Config.hpp>
#include <SFML/GpuPreference.hpp>
#include <SFML/Graphics.hpp>
#include <SFML/Main.hpp>
#include <SFML/Network.hpp>
```

```
#include <SFML/OpenGL.hpp>
#include <SFML/System.hpp>
#include <SFML/Window.hpp>
```
Include dependency graph for includes.h:

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



### 4.5.1 Detailed Description

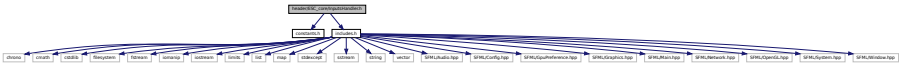
Header file for various includes.

Ref: Gomila [2023]

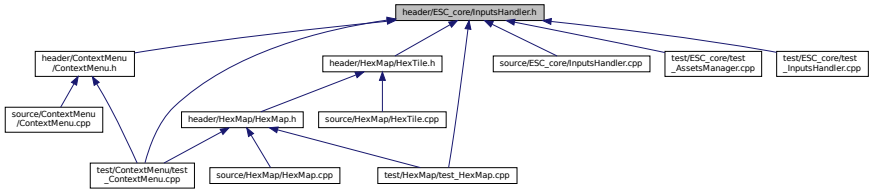
## 4.6 header/ESC_core/InputsHandler.h File Reference

Header file for the InputsHandler class.

```
#include "constants.h"
#include "includes.h"
```
Include dependency graph for InputsHandler.h:



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



## Classes

- class InputsHandler

  *A class which handles inputs from peripherals (i.e., keyboard and mouse).*

### 4.6.1 Detailed Description

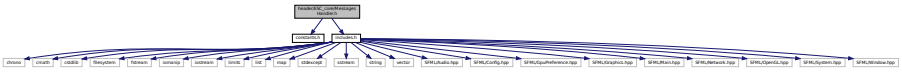
Header file for the InputsHandler class.

## 4.7 header/ESC_core/MessagesHandler.h File Reference

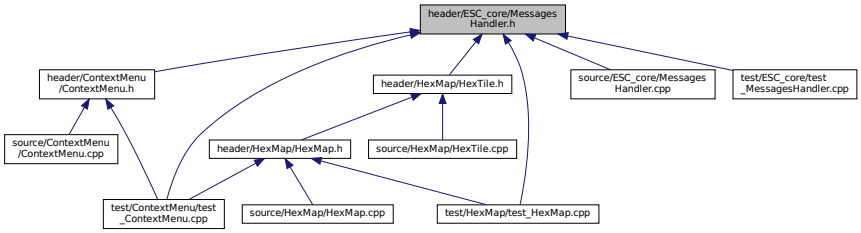
Header file for the MessagesHandler class.

```
#include "constants.h"
#include "includes.h"
```

Include dependency graph for MessagesHandler.h:



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




## Classes

- class MessagesHandler

  *A class which handles message traffic between game objects.*

### 4.7.1 Detailed Description

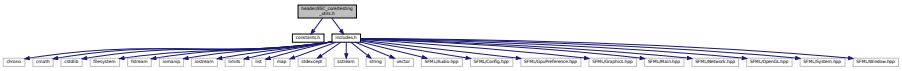
Header file for the MessagesHandler class.

## 4.8 header/ESC_core/testing_utils.h File Reference

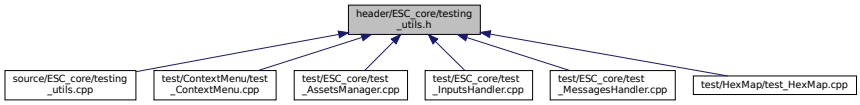
Header file for various testing utilities.

```
#include "constants.h"
#include "includes.h"
```

Include dependency graph for testing_utils.h:



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




### Functions

- void printGreen (std::string)

  *A function that sends green text to std::cout.*
- void printGold (std::string)

  *A function that sends gold text to std::cout.*
- void printRed (std::string)

  *A function that sends red text to std::cout.*
- void testFloatEquals (double, double, std::string, int)

  *Tests for the equality of two floating point numbers x and y (to within FLOAT_TOLERANCE).*
- void testGreaterThan (double, double, std::string, int)

  *Tests if x > y.*
- void testGreaterThanOrEqualTo (double, double, std::string, int)

  *Tests if x >= y.*
- void testLessThan (double, double, std::string, int)

  *Tests if x < y.*
- void testLessThanOrEqualTo (double, double, std::string, int)

  *Tests if x <= y.*
- void testTruth (bool, std::string, int)

  *Tests if the given statement is true.*
- void expectedErrorNotDetected (std::string, int)

  *A utility function to print out a meaningful error message whenever an expected error fails to be thrown/caught/detected.*

### Variables

- const double FLOAT_TOLERANCE = 1e-6

  *Tolerance for floating point equality tests.*

### 4.8.1 Detailed Description

Header file for various testing utilities.

This is a library of utility functions used throughout the various test suites.

### 4.8.2 Function Documentation

#### 4.8.2.1 expectedErrorNotDetected()

```
void expectedErrorNotDetected (
            std::string file,
            int line )
```

A utility function to print out a meaningful error message whenever an expected error fails to be thrown/caught/detected.

**Parameters**

| | |
|---|---|
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
430 {
431     std::string error_str = "\n ERROR  failed to throw expected error prior to line ";
432     error_str += std::to_string(line);
433     error_str += " of ";
434     error_str += file;
435 
436     #ifdef _WIN32
437         std::cout « error_str « std::endl;
438     #endif
439 
440     throw std::runtime_error(error_str);
441     return;
442 }   /* expectedErrorNotDetected() */
```

#### 4.8.2.2 printGold()

```
void printGold (
            std::string input_str )
```

A function that sends gold text to std::cout.

**Parameters**

| | |
|---|---|
| *input_str* | The text of the string to be sent to std::cout. |

```
82 {
83     std::cout « "\x1B[33m" « input_str « "\033[0m";
84     return;
85 }   /* printGold() */
```

#### 4.8.2.3 printGreen()

```
void printGreen (
            std::string input_str )
```

A function that sends green text to std::cout.

**Parameters**

| | |
|---|---|
| *input_str* | The text of the string to be sent to std::cout. |

```
62 {
63     std::cout « "\x1B[32m" « input_str « "\033[0m";
64     return;
65 }   /* printGreen() */
```

#### 4.8.2.4 printRed()

```
void printRed (
            std::string input_str )
```

A function that sends red text to std::cout.

**Parameters**

| | |
|---|---|
| *input_str* | The text of the string to be sent to std::cout. |

```
102 {
103     std::cout « "\x1B[31m" « input_str « "\033[0m";
104     return;
105 }   /* printRed() */
```

#### 4.8.2.5 testFloatEquals()

```
void testFloatEquals (
            double x,
            double y,
            std::string file,
            int line )
```

Tests for the equality of two floating point numbers *x* and *y* (to within FLOAT_TOLERANCE).

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
136 {
137     if (fabs(x - y) <= FLOAT_TOLERANCE) {
138         return;
```

```
139     }
140
141     std::string error_str = "ERROR: testFloatEquals():\t in ";
142     error_str += file;
143     error_str += "\tline ";
144     error_str += std::to_string(line);
145     error_str += ":\t\n";
146     error_str += std::to_string(x);
147     error_str += " and ";
148     error_str += std::to_string(y);
149     error_str += " are not equal to within +/- ";
150     error_str += std::to_string(FLOAT_TOLERANCE);
151     error_str += "\n";
152
153     #ifdef _WIN32
154         std::cout << error_str << std::endl;
155     #endif
156
157     throw std::runtime_error(error_str);
158     return;
159 }   /* testFloatEquals() */
```

#### 4.8.2.6 testGreaterThan()

```
void testGreaterThan (
             double x,
             double y,
             std::string file,
             int line )
```

Tests if x > y.

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
189 {
190     if (x > y) {
191         return;
192     }
193
194     std::string error_str = "ERROR: testGreaterThan():\t in ";
195     error_str += file;
196     error_str += "\tline ";
197     error_str += std::to_string(line);
198     error_str += ":\t\n";
199     error_str += std::to_string(x);
200     error_str += " is not greater than ";
201     error_str += std::to_string(y);
202     error_str += "\n";
203
204     #ifdef _WIN32
205         std::cout << error_str << std::endl;
206     #endif
207
208     throw std::runtime_error(error_str);
209     return;
210 }   /* testGreaterThan() */
```

#### 4.8.2.7 testGreaterThanOrEqualTo()

```
void testGreaterThanOrEqualTo (
             double x,
```

```
            double y,
            std::string file,
            int line )
```

Tests if x >= y.

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
240 {
241     if (x >= y) {
242         return;
243     }
244
245     std::string error_str = "ERROR: testGreaterThanOrEqualTo():\t in ";
246     error_str += file;
247     error_str += "\tline ";
248     error_str += std::to_string(line);
249     error_str += ":\t\n";
250     error_str += std::to_string(x);
251     error_str += " is not greater than or equal to ";
252     error_str += std::to_string(y);
253     error_str += "\n";
254
255     #ifdef _WIN32
256         std::cout << error_str << std::endl;
257     #endif
258
259     throw std::runtime_error(error_str);
260     return;
261 }   /* testGreaterThanOrEqualTo() */
```

#### 4.8.2.8 testLessThan()

```
void testLessThan (
            double x,
            double y,
            std::string file,
            int line )
```

Tests if x < y.

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
291 {
292     if (x < y) {
293         return;
294     }
295
296     std::string error_str = "ERROR: testLessThan():\t in ";
297     error_str += file;
298     error_str += "\tline ";
299     error_str += std::to_string(line);
300     error_str += ":\t\n";
```

```
301     error_str += std::to_string(x);
302     error_str += " is not less than ";
303     error_str += std::to_string(y);
304     error_str += "\n";
305 
306     #ifdef _WIN32
307         std::cout « error_str « std::endl;
308     #endif
309 
310     throw std::runtime_error(error_str);
311     return;
312 }   /* testLessThan() */
```

#### 4.8.2.9 testLessThanOrEqualTo()

```
void testLessThanOrEqualTo (
             double x,
             double y,
             std::string file,
             int line )
```

Tests if x <= y.

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
342 {
343     if (x <= y) {
344         return;
345     }
346 
347     std::string error_str = "ERROR: testLessThanOrEqualTo():\t in ";
348     error_str += file;
349     error_str += "\tline ";
350     error_str += std::to_string(line);
351     error_str += ":\t\n";
352     error_str += std::to_string(x);
353     error_str += " is not less than or equal to ";
354     error_str += std::to_string(y);
355     error_str += "\n";
356 
357     #ifdef _WIN32
358         std::cout « error_str « std::endl;
359     #endif
360 
361     throw std::runtime_error(error_str);
362     return;
363 }   /* testLessThanOrEqualTo() */
```

#### 4.8.2.10 testTruth()

```
void testTruth (
             bool statement,
             std::string file,
             int line )
```

Tests if the given statement is true.

**Parameters**

| | |
|---|---|
| *statement* | The statement whose truth is to be tested ("1 == 0", for example). |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
390 {
391     if (statement) {
392         return;
393     }
394
395     std::string error_str = "ERROR: testTruth():\t in ";
396     error_str += file;
397     error_str += "\tline ";
398     error_str += std::to_string(line);
399     error_str += ":\t\n";
400     error_str += "Given statement is not true";
401
402     #ifdef _WIN32
403         std::cout « error_str « std::endl;
404     #endif
405
406     throw std::runtime_error(error_str);
407     return;
408 }   /* testTruth() */
```

### 4.8.3 Variable Documentation

#### 4.8.3.1 FLOAT_TOLERANCE

```
const double FLOAT_TOLERANCE = 1e-6
```

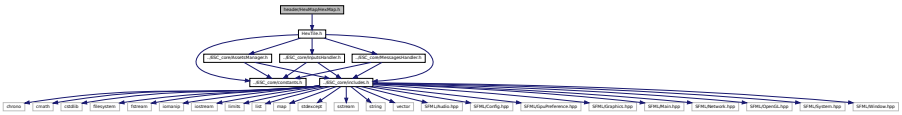
Tolerance for floating point equality tests.

## 4.9 header/HexMap/HexMap.h File Reference

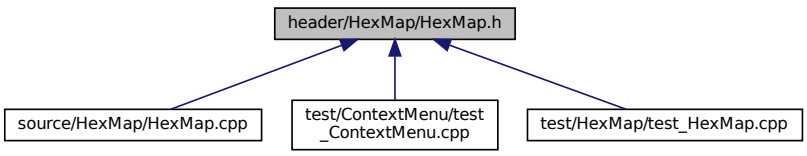
Header file for the HexMap class.

```
#include "HexTile.h"
```

Include dependency graph for HexMap.h:



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



## Classes

- class HexMap

  *A class which defines a hex map of hex tiles.*

### 4.9.1 Detailed Description

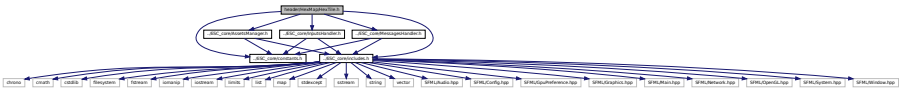
Header file for the HexMap class.

## 4.10 header/HexMap/HexTile.h File Reference

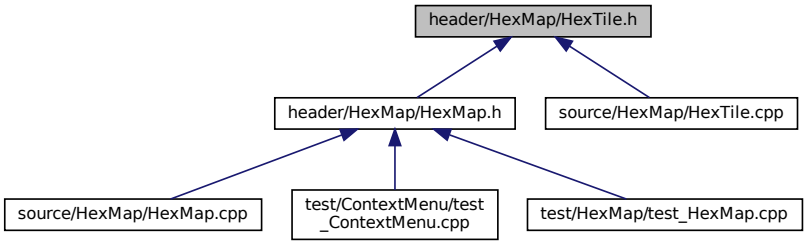
Header file for the HexTile class.

```
#include "../ESC_core/constants.h"
#include "../ESC_core/includes.h"
#include "../ESC_core/AssetsManager.h"
#include "../ESC_core/InputsHandler.h"
#include "../ESC_core/MessagesHandler.h"
```

Include dependency graph for HexTile.h:



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




## Classes

- class HexTile

  *A class which defines a hex tile of the hex map.*

## Enumerations

- enum TileType {
  FOREST , LAKE , MOUNTAINS , OCEAN ,
  PLAINS , N_TILE_TYPES }

  *An enumeration of the different tile types.*
- enum TileResource {
  POOR , BELOW_AVERAGE , AVERAGE , ABOVE_AVERAGE ,
  GOOD , N_TILE_RESOURCES }

  *An enumeration of the different tile resource values.*

## Functions

- const sf::Color FOREST_GREEN (34, 139, 34)

  *The base colour of a forest tile.*
- const sf::Color LAKE_BLUE (0, 102, 204)

  *The base colour of a lake (water) tile.*
- const sf::Color MOUNTAINS_GREY (97, 110, 113)

  *The base colour of a mountains tile.*
- const sf::Color OCEAN_BLUE (0, 51, 102)

  *The base colour of an ocean (water) tile.*
- const sf::Color PLAINS_YELLOW (245, 222, 133)

  *The base colour of a plains tile.*

## Variables

- const std::vector< double > tile_type_cumulative_probabilities
- const std::vector< double > tile_resource_cumulative_probabilities

### 4.10.1 Detailed Description

Header file for the HexTile class.

### 4.10.2 Enumeration Type Documentation

#### 4.10.2.1 TileResource

```
enum TileResource
```

An enumeration of the different tile resource values.

**Enumerator**

| | |
|---|---|
| POOR | A poor resource value. |
| BELOW_AVERAGE | A below average resource value. |
| AVERAGE | An average resource value. |
| ABOVE_AVERAGE | An above average resource value. |
| GOOD | A good resource value. |
| N_TILE_RESOURCES | A simple hack to get the number of elements in TileResource. |

```
64                  {
65     POOR,
66     BELOW_AVERAGE,
67     AVERAGE,
68     ABOVE_AVERAGE,
69     GOOD,
70     N_TILE_RESOURCES
71 };
```

#### 4.10.2.2 TileType

```
enum TileType
```

An enumeration of the different tile types.

**Enumerator**

| | |
|---|---|
| FOREST | A forest tile. |
| LAKE | A lake tile. |
| MOUNTAINS | A mountains tile. |
| OCEAN | An ocean tile. |
| PLAINS | A plains tile. |
| N_TILE_TYPES | A simple hack to get the number of elements in TileType. |

```
35              {
36     FOREST,
37     LAKE,
38     MOUNTAINS,
39     OCEAN,
40     PLAINS,
41     N_TILE_TYPES
42 };
```

### 4.10.3 Function Documentation

#### 4.10.3.1 FOREST_GREEN()

```
const sf::Color FOREST_GREEN (
             34 ,
             139 ,
             34  )
```

The base colour of a forest tile.

#### 4.10.3.2 LAKE_BLUE()

```
const sf::Color LAKE_BLUE (
             0 ,
             102 ,
             204  )
```

The base colour of a lake (water) tile.

#### 4.10.3.3 MOUNTAINS_GREY()

```
const sf::Color MOUNTAINS_GREY (
            97 ,
            110 ,
            113  )
```

The base colour of a mountains tile.

#### 4.10.3.4 OCEAN_BLUE()

```
const sf::Color OCEAN_BLUE (
            0 ,
            51 ,
            102  )
```

The base colour of an ocean (water) tile.

#### 4.10.3.5 PLAINS_YELLOW()

```
const sf::Color PLAINS_YELLOW (
            245 ,
            222 ,
            133  )
```

The base colour of a plains tile.

### 4.10.4 Variable Documentation

#### 4.10.4.1 tile_resource_cumulative_probabilities

```
const std::vector<double> tile_resource_cumulative_probabilities
```

**Initial value:**

```
= {
    0.10,
    0.30,
    0.70,
    0.90,
    1.00
}
```

#### 4.10.4.2 tile_type_cumulative_probabilities

```
const std::vector<double> tile_type_cumulative_probabilities
```

**Initial value:**

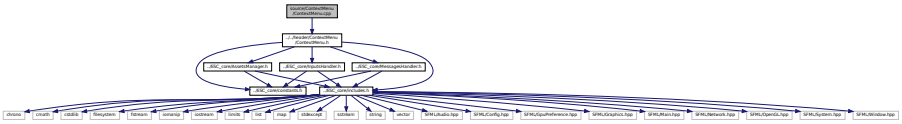
```
= {
    0.25,
    0.50,
    0.75,
    1.00
}
```

## 4.11 source/ContextMenu/ContextMenu.cpp File Reference

Implementation file for the ContextMenu class.

```
#include "../../header/ContextMenu/ContextMenu.h"
```

Include dependency graph for ContextMenu.cpp:



### 4.11.1 Detailed Description

Implementation file for the ContextMenu class.

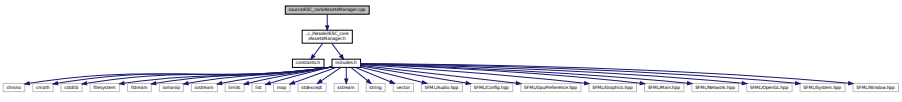
A class which defines a context menu for the game.

## 4.12 source/ESC_core/AssetsManager.cpp File Reference

Implementation file for the AssetsManager class.

```
#include "../../header/ESC_core/AssetsManager.h"
```

Include dependency graph for AssetsManager.cpp:



### 4.12.1 Detailed Description

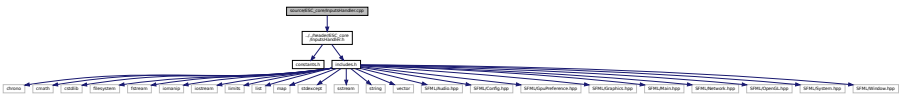
Implementation file for the AssetsManager class.

A class which manages visual and sound assets.

## 4.13 source/ESC_core/InputsHandler.cpp File Reference

Implementation file for the InputsHandler class.

```
#include "../../header/ESC_core/InputsHandler.h"
```
Include dependency graph for InputsHandler.cpp:



### 4.13.1 Detailed Description

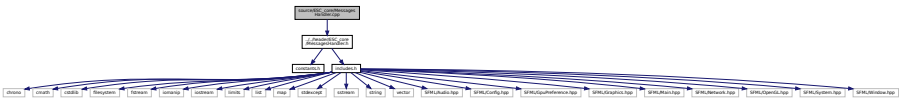
Implementation file for the InputsHandler class.

A class which handles inputs from peripherals (i.e., keyboard and mouse).

## 4.14 source/ESC_core/MessagesHandler.cpp File Reference

Implementation file for the MessagesHandler class.

```
#include "../../header/ESC_core/MessagesHandler.h"
```
Include dependency graph for MessagesHandler.cpp:



### 4.14.1 Detailed Description

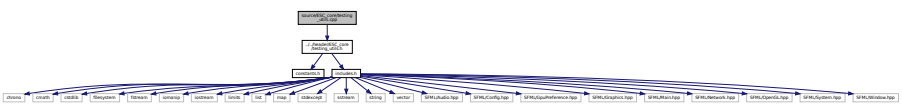
Implementation file for the MessagesHandler class.

A class which handles message traffic between game objects.

## 4.15 source/ESC_core/testing_utils.cpp File Reference

Implementation file for various testing utilities.

```
#include "../../header/ESC_core/testing_utils.h"
```
Include dependency graph for testing_utils.cpp:



## Functions

- void printGreen (std::string input_str)

  *A function that sends green text to std::cout.*
- void printGold (std::string input_str)

  *A function that sends gold text to std::cout.*
- void printRed (std::string input_str)

  *A function that sends red text to std::cout.*
- void testFloatEquals (double x, double y, std::string file, int line)

  *Tests for the equality of two floating point numbers x and y (to within FLOAT_TOLERANCE).*
- void testGreaterThan (double x, double y, std::string file, int line)

  *Tests if x > y.*
- void testGreaterThanOrEqualTo (double x, double y, std::string file, int line)

  *Tests if x >= y.*
- void testLessThan (double x, double y, std::string file, int line)

  *Tests if x < y.*
- void testLessThanOrEqualTo (double x, double y, std::string file, int line)

  *Tests if x <= y.*
- void testTruth (bool statement, std::string file, int line)

  *Tests if the given statement is true.*
- void expectedErrorNotDetected (std::string file, int line)

  *A utility function to print out a meaningful error message whenever an expected error fails to be thrown/caught/detected.*

### 4.15.1 Detailed Description

Implementation file for various testing utilities.

This is a library of utility functions used throughout the various test suites.

### 4.15.2 Function Documentation

#### 4.15.2.1 expectedErrorNotDetected()

```
void expectedErrorNotDetected (
            std::string file,
            int line )
```

A utility function to print out a meaningful error message whenever an expected error fails to be thrown/caught/detected.

**Parameters**

| | |
|---|---|
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
430 {
431     std::string error_str = "\n ERROR  failed to throw expected error prior to line ";
432     error_str += std::to_string(line);
```

```
433     error_str += " of ";
434     error_str += file;
435
436     #ifdef _WIN32
437         std::cout « error_str « std::endl;
438     #endif
439
440     throw std::runtime_error(error_str);
441     return;
442 }   /* expectedErrorNotDetected() */
```

#### 4.15.2.2 printGold()

```
void printGold (
              std::string input_str )
```

A function that sends gold text to std::cout.

**Parameters**

| | |
|---|---|
| *input_str* | The text of the string to be sent to std::cout. |

```
82 {
83     std::cout « "\x1B[33m" « input_str « "\033[0m";
84     return;
85 }   /* printGold() */
```

#### 4.15.2.3 printGreen()

```
void printGreen (
              std::string input_str )
```

A function that sends green text to std::cout.

**Parameters**

| | |
|---|---|
| *input_str* | The text of the string to be sent to std::cout. |

```
62 {
63     std::cout « "\x1B[32m" « input_str « "\033[0m";
64     return;
65 }   /* printGreen() */
```

#### 4.15.2.4 printRed()

```
void printRed (
              std::string input_str )
```

A function that sends red text to std::cout.

**Parameters**

| | |
|---|---|
| *input_str* | The text of the string to be sent to std::cout. |

```
102 {
103     std::cout « "\x1B[31m" « input_str « "\033[0m";
104     return;
105 }   /* printRed() */
```

#### 4.15.2.5 testFloatEquals()

```
void testFloatEquals (
            double x,
            double y,
            std::string file,
            int line )
```

Tests for the equality of two floating point numbers *x* and *y* (to within FLOAT_TOLERANCE).

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
136 {
137     if (fabs(x - y) <= FLOAT_TOLERANCE) {
138         return;
139     }
140
141     std::string error_str = "ERROR: testFloatEquals():\t in ";
142     error_str += file;
143     error_str += "\tline ";
144     error_str += std::to_string(line);
145     error_str += ":\t\n";
146     error_str += std::to_string(x);
147     error_str += " and ";
148     error_str += std::to_string(y);
149     error_str += " are not equal to within +/- ";
150     error_str += std::to_string(FLOAT_TOLERANCE);
151     error_str += "\n";
152
153     #ifdef _WIN32
154         std::cout « error_str « std::endl;
155     #endif
156
157     throw std::runtime_error(error_str);
158     return;
159 }   /* testFloatEquals() */
```

#### 4.15.2.6 testGreaterThan()

```
void testGreaterThan (
            double x,
            double y,
            std::string file,
            int line )
```

Tests if x $>$ y.

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
189 {
190     if (x > y) {
191         return;
192     }
193
194     std::string error_str = "ERROR: testGreaterThan():\t in ";
195     error_str += file;
196     error_str += "\tline ";
197     error_str += std::to_string(line);
198     error_str += ":\t\n";
199     error_str += std::to_string(x);
200     error_str += " is not greater than ";
201     error_str += std::to_string(y);
202     error_str += "\n";
203
204     #ifdef _WIN32
205         std::cout « error_str « std::endl;
206     #endif
207
208     throw std::runtime_error(error_str);
209     return;
210 }   /* testGreaterThan() */
```

#### 4.15.2.7 testGreaterThanOrEqualTo()

```
void testGreaterThanOrEqualTo (
              double x,
              double y,
              std::string file,
              int line )
```

Tests if x >= y.

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
240 {
241     if (x >= y) {
242         return;
243     }
244
245     std::string error_str = "ERROR: testGreaterThanOrEqualTo():\t in ";
246     error_str += file;
247     error_str += "\tline ";
248     error_str += std::to_string(line);
249     error_str += ":\t\n";
250     error_str += std::to_string(x);
251     error_str += " is not greater than or equal to ";
252     error_str += std::to_string(y);
253     error_str += "\n";
254
255     #ifdef _WIN32
256         std::cout « error_str « std::endl;
257     #endif
258
259     throw std::runtime_error(error_str);
```

```
260     return;
261 }   /* testGreaterThanOrEqualTo() */
```

#### 4.15.2.8 testLessThan()

```
void testLessThan (
            double x,
            double y,
            std::string file,
            int line )
```

Tests if x < y.

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
291 {
292     if (x < y) {
293         return;
294     }
295 
296     std::string error_str = "ERROR: testLessThan():\t in ";
297     error_str += file;
298     error_str += "\tline ";
299     error_str += std::to_string(line);
300     error_str += ":\t\n";
301     error_str += std::to_string(x);
302     error_str += " is not less than ";
303     error_str += std::to_string(y);
304     error_str += "\n";
305 
306     #ifdef _WIN32
307         std::cout « error_str « std::endl;
308     #endif
309 
310     throw std::runtime_error(error_str);
311     return;
312 }   /* testLessThan() */
```

#### 4.15.2.9 testLessThanOrEqualTo()

```
void testLessThanOrEqualTo (
            double x,
            double y,
            std::string file,
            int line )
```

Tests if x <= y.

**Parameters**

| | |
|---|---|
| *x* | The first of two numbers to test. |
| *y* | The second of two numbers to test. |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
342 {
343     if (x <= y) {
344         return;
345     }
346 
347     std::string error_str = "ERROR: testLessThanOrEqualTo():\t in ";
348     error_str += file;
349     error_str += "\tline ";
350     error_str += std::to_string(line);
351     error_str += ":\t\n";
352     error_str += std::to_string(x);
353     error_str += " is not less than or equal to ";
354     error_str += std::to_string(y);
355     error_str += "\n";
356 
357     #ifdef _WIN32
358         std::cout « error_str « std::endl;
359     #endif
360 
361     throw std::runtime_error(error_str);
362     return;
363 }   /* testLessThanOrEqualTo() */
```

#### 4.15.2.10 testTruth()

```
void testTruth (
              bool statement,
              std::string file,
              int line )
```

Tests if the given statement is true.

**Parameters**

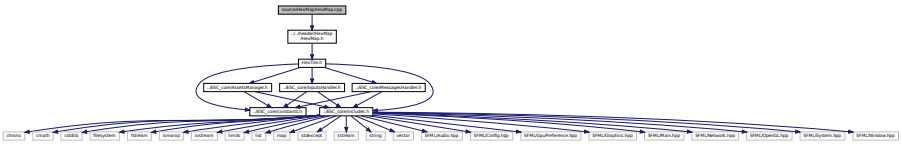
| | |
|---|---|
| *statement* | The statement whose truth is to be tested ("1 == 0", for example). |
| *file* | The file in which the test is applied (you should be able to just pass in "__FILE__"). |
| *line* | The line of the file in which the test is applied (you should be able to just pass in "__LINE__"). |

```
390 {
391     if (statement) {
392         return;
393     }
394 
395     std::string error_str = "ERROR: testTruth():\t in ";
396     error_str += file;
397     error_str += "\tline ";
398     error_str += std::to_string(line);
399     error_str += ":\t\n";
400     error_str += "Given statement is not true";
401 
402     #ifdef _WIN32
403         std::cout « error_str « std::endl;
404     #endif
405 
406     throw std::runtime_error(error_str);
407     return;
408 }   /* testTruth() */
```

## 4.16 source/HexMap/HexMap.cpp File Reference

Implementation file for the HexMap class.

```
#include "../../header/HexMap/HexMap.h"
```
Include dependency graph for HexMap.cpp:



### 4.16.1 Detailed Description

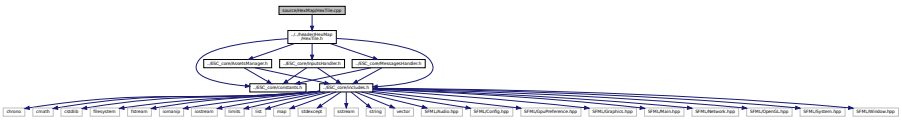
Implementation file for the HexMap class.

A class which defines a hex map of hex tiles.

## 4.17 source/HexMap/HexTile.cpp File Reference

Implementation file for the HexTile class.

```
#include "../../header/HexMap/HexTile.h"
```
Include dependency graph for HexTile.cpp:



### 4.17.1 Detailed Description

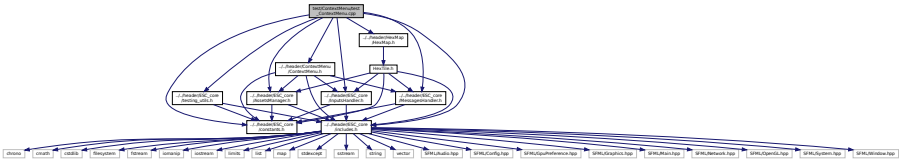
Implementation file for the HexTile class.

A class which defines a tile of a hex map.

## 4.18 test/ContextMenu/test_ContextMenu.cpp File Reference

Suite of tests for the ContextMenu class.

```
#include "../../header/ESC_core/constants.h"
#include "../../header/ESC_core/includes.h"
#include "../../header/ESC_core/testing_utils.h"
#include "../../header/ESC_core/AssetsManager.h"
#include "../../header/ESC_core/InputsHandler.h"
#include "../../header/ESC_core/MessagesHandler.h"
#include "../../header/HexMap/HexMap.h"
#include "../../header/ContextMenu/ContextMenu.h"
```
Include dependency graph for test_ContextMenu.cpp:



## Functions

- int main (int argc, char **argv)

### 4.18.1 Detailed Description

Suite of tests for the ContextMenu class.

A suite of tests for the ContextMenu class.

### 4.18.2 Function Documentation

#### 4.18.2.1 main()

```
int main (
              int argc,
              char ** argv )
```

```
42 {
43     #ifdef _WIN32
44         activateVirtualTerminal();
45     #endif  /* _WIN32 */
46 
47     printGold("\tTesting ContextMenu");
48     std::cout « std::endl;
49 
50     srand(time(NULL));
51     int n_dots = 8;
52 
53 
54     try {
55         //  1. construct, load/open some test assets
56         AssetsManager assets_manager;
57         InputsHandler inputs_handler;
58         MessagesHandler messages_handler;
59 
60         assets_manager.loadFont("assets/fonts/DroidSansMono.ttf", "DroidSansMono");
61         assets_manager.loadFont("assets/fonts/Glass_TTY_VT220.ttf", "Glass_TTY_VT220");
62 
63 
64         //  2. test game loop
65         sf::Clock clock;
66         sf::Event event;
67         sf::RenderWindow window(
68             sf::VideoMode(GAME_WIDTH, GAME_HEIGHT),
69             "Testing ContextMenu"
70         );
71 
72         double screen_width = window.getSize().x;
73         double screen_height = window.getSize().y;
74 
75         testFloatEquals(
76             screen_width,
77             1200,
78             __FILE__,
79             __LINE__
80         );
81 
82         testFloatEquals(
83             screen_height,
84             800,
85             __FILE__,
86             __LINE__
87         );
88 
89         unsigned long long int frame = 0;
90         double time_since_run_s = 0;
91 
92         ContextMenu context_menu(
```

```
93              &assets_manager,
94              &inputs_handler,
95              &messages_handler,
96              &window
97          );
98
99          HexMap hex_map(
100             6,
101             &assets_manager,
102             &inputs_handler,
103             &messages_handler,
104             &window
105         );
106
107         while (window.isOpen()) {
108             time_since_run_s = clock.getElapsedTime().asSeconds();
109
110             if (
111                 time_since_run_s >= (frame + 1) * SECONDS_PER_FRAME
112             ) {
113                 while (window.pollEvent(event))
114                 {
115                     inputs_handler.process(&event);
116
117                     if (event.type == sf::Event::Closed) {
118                         window.close();
119                     }
120                 }
121
122                 context_menu.process();
123
124                 //...
125
126                 hex_map.process();
127
128                 if (inputs_handler.key_pressed_once_vec[sf::Keyboard::Q]) {
129                     std::cout << "Q" << std::endl;
130                     hex_map.reroll();
131                 }
132
133                 if (inputs_handler.key_pressed_once_vec[sf::Keyboard::R]) {
134                     std::cout << "R" << std::endl;
135                     hex_map.toggleResourceOverlay();
136                 }
137
138                 if (inputs_handler.key_pressed_once_vec[sf::Keyboard::A]) {
139                     std::cout << "A" << std::endl;
140                     hex_map.assess();
141                 }
142
143                 window.clear();
144
145                 context_menu.draw();
146                 hex_map.draw();
147
148                 window.display();
149
150                 inputs_handler.reset();
151
152                 std::cout << frame << " : " << time_since_run_s << "\r" << std::flush;
153                 frame++;
154             }
155         }
156     }
157
158
159     catch (...) {
160         //...
161
162         printGold(" ");
163         for (int i = 0; i < n_dots; i++) {
164             printGold(".");
165         }
166         printGold(" ");
167         printRed("FAIL");
168         std::cout << std::endl;
169         throw;
170     }
171
172
173     //...
174
175     printGold(" ");
176     for (int i = 0; i < n_dots; i++) {
177         printGold(".");
178     }
179     printGold(" ");
```

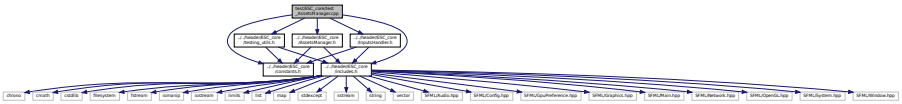
```
180     printGreen("PASS");
181     std::cout « std::endl;
182
183     return 0;
184 }   /* main() */
```

## 4.19 test/ESC_core/test_AssetsManager.cpp File Reference

Suite of tests for the AssetsManager class.

```
#include "../../header/ESC_core/constants.h"
#include "../../header/ESC_core/includes.h"
#include "../../header/ESC_core/testing_utils.h"
#include "../../header/ESC_core/AssetsManager.h"
#include "../../header/ESC_core/InputsHandler.h"
```

Include dependency graph for test_AssetsManager.cpp:



### Functions

- int main (int argc, char ∗∗argv)

### 4.19.1 Detailed Description

Suite of tests for the AssetsManager class.

A suite of tests for the AssetsManager class.

### 4.19.2 Function Documentation

#### 4.19.2.1 main()

```
int main (
              int argc,
              char ** argv )
38 {
39     #ifdef _WIN32
40         activateVirtualTerminal();
41     #endif  /* _WIN32 */
42
43     printGold("\tTesting AssetsManager");
44     std::cout « std::endl;
45
46     srand(time(NULL));
47     int n_dots = 8;
48
49
```

```
50      try {
51          //  1. construct
52          InputsHandler inputs_handler;
53          AssetsManager assets_manager;
54
55
56          //  2. load/open some test assets
57          assets_manager.loadFont("assets/fonts/DroidSansMono.ttf", "DroidSansMono");
58          assets_manager.loadTexture(
59              "assets/ESC_brand/ESC_key_98x81.png",
60              "ESC_key_98x81"
61          );
62          assets_manager.loadSound("assets/ESC_brand/key_press.ogg", "key_press");
63          assets_manager.loadTrack(
64              "assets/audio/tracks/AlexanderBlu_BackgroundElectronicModernMusic.ogg",
65              "AlexanderBlu_BackgroundElectronicModernMusic"
66          );
67
68
69          //  3. test game loop
70          sf::Clock clock;
71          sf::Event event;
72          sf::RenderWindow window(sf::VideoMode(800, 600), "Testing AssetsManager");
73
74          double screen_width = window.getSize().x;
75          double screen_height = window.getSize().y;
76
77          testFloatEquals(
78              screen_width,
79              800,
80              __FILE__,
81              __LINE__
82          );
83
84          testFloatEquals(
85              screen_height,
86              600,
87              __FILE__,
88              __LINE__
89          );
90
91          unsigned long long int frame = 0;
92          double time_since_run_s = 0;
93
94          assets_manager.playTrack();
95
96          sf::Sprite ESC_key(*(assets_manager.getTexture("ESC_key_98x81")));
97
98          double sprite_width = ESC_key.getLocalBounds().width;
99          double sprite_height = ESC_key.getLocalBounds().height;
100
101          double sprite_velocity_x = 256 * (2 * ((double)rand() / RAND_MAX) - 1);
102          double sprite_velocity_y = 256 * (2 * ((double)rand() / RAND_MAX) - 1);
103
104          ESC_key.setOrigin(sprite_width / 2, sprite_height / 2);
105          ESC_key.setPosition(
106              (screen_width - sprite_width) * ((double)rand() / RAND_MAX) + sprite_width / 2,
107              (screen_height - sprite_height) * ((double)rand() / RAND_MAX) + sprite_height / 2
108          );
109
110          sf::Text click_text(
111              "CLICK!",
112              *(assets_manager.getFont("DroidSansMono")),
113              16
114          );
115
116          double text_width = click_text.getLocalBounds().width;
117          double text_height = click_text.getLocalBounds().height;
118
119          click_text.setOrigin(text_width / 2, text_height / 2);
120
121          int alpha = 255;
122
123          click_text.setFillColor(sf::Color(255, 255, 255, alpha));
124
125          while (window.isOpen()) {
126              time_since_run_s = clock.getElapsedTime().asSeconds();
127
128              if (
129                  time_since_run_s >= (frame + 1) * SECONDS_PER_FRAME
130              ) {
131                  while (window.pollEvent(event))
132                  {
133                      //...
134
135                      if (event.type == sf::Event::Closed) {
136                          window.close();
```

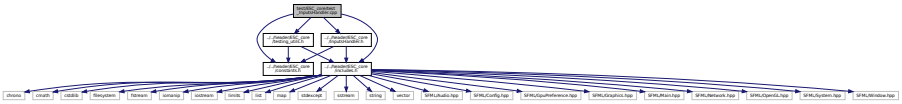
```
137                     }
138                 }
139
140                 ESC_key.move(
141                     sprite_velocity_x * SECONDS_PER_FRAME,
142                     sprite_velocity_y * SECONDS_PER_FRAME
143                 );
144
145                 if (
146                     ESC_key.getPosition().x <= sprite_width / 2 or
147                     ESC_key.getPosition().x >= screen_width - sprite_width / 2
148                 ) {
149                     sprite_velocity_x *= -1;
150
151                     assets_manager.getSound("key_press")->play();
152
153                     alpha = 255;
154                     click_text.setPosition(
155                         ESC_key.getPosition().x,
156                         ESC_key.getPosition().y
157                     );
158                 }
159
160                 if (
161                     ESC_key.getPosition().y <= sprite_height / 2 or
162                     ESC_key.getPosition().y >= screen_height - sprite_height / 2
163                 ) {
164                     sprite_velocity_y *= -1;
165
166                     assets_manager.getSound("key_press")->play();
167
168                     alpha = 255;
169                     click_text.setPosition(
170                         ESC_key.getPosition().x,
171                         ESC_key.getPosition().y
172                     );
173                 }
174
175                 window.clear();
176
177                 window.draw(ESC_key);
178                 window.draw(click_text);
179
180                 window.display();
181
182                 alpha -= 8;
183                 if (alpha < 0) {
184                     alpha = 0;
185                 }
186
187                 click_text.setFillColor(sf::Color(255, 255, 255, alpha));
188
189                 std::cout « frame « " : " « time_since_run_s « "\r" « std::flush;
190                 frame++;
191             }
192         }
193     }
194
195
196     catch (...) {
197         //...
198
199         printGold(" ");
200         for (int i = 0; i < n_dots; i++) {
201             printGold(".");
202         }
203         printGold(" ");
204         printRed("FAIL");
205         std::cout « std::endl;
206         throw;
207     }
208
209
210     //...
211
212     printGold(" ");
213     for (int i = 0; i < n_dots; i++) {
214         printGold(".");
215     }
216     printGold(" ");
217     printGreen("PASS");
218     std::cout « std::endl;
219
220     return 0;
221 }   /* main() */
```

# 4.20 test/ESC_core/test_InputsHandler.cpp File Reference

Suite of tests for the InputsHandler class.

```
#include "../../header/ESC_core/constants.h"
#include "../../header/ESC_core/includes.h"
#include "../../header/ESC_core/testing_utils.h"
#include "../../header/ESC_core/InputsHandler.h"
```

Include dependency graph for test_InputsHandler.cpp:



## Functions

- int main (int argc, char **argv)

### 4.20.1 Detailed Description

Suite of tests for the InputsHandler class.

A suite of tests for the InputsHandler class.

### 4.20.2 Function Documentation

#### 4.20.2.1 main()

```
int main (
              int argc,
              char ** argv )
37 {
38     #ifdef _WIN32
39         activateVirtualTerminal();
40     #endif  /* _WIN32 */
41
42     printGold("\tTesting InputsHandler");
43     std::cout « std::endl;
44
45     srand(time(NULL));
46     int n_dots = 8;
47
48
49     try {
50         //  1. construct and spot check attributes
51         InputsHandler inputs_handler;
52
53         testFloatEquals(
54             int(sf::Keyboard::KeyCount),
55             101,
56             __FILE__,
57             __LINE__
58         );
59
```

```
60          testFloatEquals(
61              inputs_handler.key_press_vec.size(),
62              int(sf::Keyboard::KeyCount),
63              __FILE__,
64              __LINE__
65          );
66
67          testFloatEquals(
68              inputs_handler.key_pressed_once_vec.size(),
69              int(sf::Keyboard::KeyCount),
70              __FILE__,
71              __LINE__
72          );
73
74
75          //  2. test game loop
76          sf::Clock clock;
77          sf::Event event;
78          sf::RenderWindow window(sf::VideoMode(800, 600), "Testing InputsHandler");
79
80          double screen_width = window.getSize().x;
81          double screen_height = window.getSize().y;
82
83          testFloatEquals(
84              screen_width,
85              800,
86              __FILE__,
87              __LINE__
88          );
89
90          testFloatEquals(
91              screen_height,
92              600,
93              __FILE__,
94              __LINE__
95          );
96
97          unsigned long long int frame = 0;
98          double time_since_run_s = 0;
99
100          while (window.isOpen()) {
101              time_since_run_s = clock.getElapsedTime().asSeconds();
102
103              if (
104                  time_since_run_s >= (frame + 1) * SECONDS_PER_FRAME
105              ) {
106                  while (window.pollEvent(event))
107                  {
108                      inputs_handler.process(&event);
109
110                      if (event.type == sf::Event::Closed) {
111                          window.close();
112                      }
113                  }
114
115                  window.clear();
116                  window.display();
117
118                  inputs_handler.printKeysPressed();
119
120                  if (inputs_handler.key_pressed_once_vec[sf::Keyboard::Enter]) {
121                      std::cout « "Enter" « std::endl;
122                  }
123
124
125
126                  inputs_handler.reset();
127
128                  std::cout « frame « " : " « time_since_run_s « "\r" « std::flush;
129                  frame++;
130              }
131          }
132      }
133
134
135      catch (...) {
136          //...
137
138          printGold(" ");
139          for (int i = 0; i < n_dots; i++) {
140              printGold(".");
141          }
142          printGold(" ");
143          printRed("FAIL");
144          std::cout « std::endl;
145          throw;
146      }
```

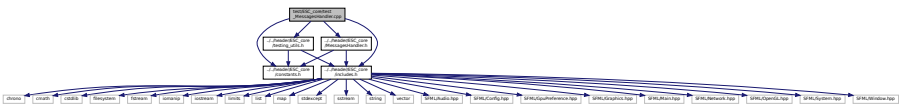
```
147
148
149     //...
150
151     printGold(" ");
152     for (int i = 0; i < n_dots; i++) {
153         printGold(".");
154     }
155     printGold(" ");
156     printGreen("PASS");
157     std::cout « std::endl;
158
159     return 0;
160 }   /* main() */
```

## 4.21 test/ESC_core/test_MessagesHandler.cpp File Reference

Suite of tests for the MessagesHandler class.

```
#include "../../header/ESC_core/constants.h"
#include "../../header/ESC_core/includes.h"
#include "../../header/ESC_core/testing_utils.h"
#include "../../header/ESC_core/MessagesHandler.h"
```

Include dependency graph for test_MessagesHandler.cpp:



### Functions

- int main (int argc, char **argv)

### 4.21.1 Detailed Description

Suite of tests for the MessagesHandler class.

A suite of tests for the MessagesHandler class.

### 4.21.2 Function Documentation

#### 4.21.2.1 main()

```
int main (
              int argc,
              char ** argv )
37 {
38     #ifdef _WIN32
39         activateVirtualTerminal();
40     #endif  /* _WIN32 */
41
42     printGold("\tTesting MessagesHandler");
43     std::cout « std::endl;
44
45     srand(time(NULL));
46     int n_dots = 8;
47
48
49     try {
50         //  1. construct
51         MessagesHandler messages_handler;
52
53
54         //  2. test game loop
55         sf::Clock clock;
56         sf::Event event;
57         sf::RenderWindow window(sf::VideoMode(800, 600), "Testing MessagesHandler");
58
59         double screen_width = window.getSize().x;
60         double screen_height = window.getSize().y;
61
62         testFloatEquals(
63             screen_width,
64             800,
65             __FILE__,
66             __LINE__
67         );
68
69         testFloatEquals(
70             screen_height,
71             600,
72             __FILE__,
73             __LINE__
74         );
75
76         unsigned long long int frame = 0;
77         double time_since_run_s = 0;
78
79         while (window.isOpen()) {
80             time_since_run_s = clock.getElapsedTime().asSeconds();
81
82             if (
83                 time_since_run_s >= (frame + 1) * SECONDS_PER_FRAME
84             ) {
85                 while (window.pollEvent(event))
86                 {
87                     //...
88
89                     if (event.type == sf::Event::Closed) {
90                         window.close();
91                     }
92                 }
93
94                 window.clear();
95                 window.display();
96
97                 std::cout « frame « " : " « time_since_run_s « "\r" « std::flush;
98                 frame++;
99             }
100         }
101     }
102
103
104     catch (...) {
105         //...
106
107         printGold(" ");
108         for (int i = 0; i < n_dots; i++) {
109             printGold(".");
110         }
111         printGold(" ");
112         printRed("FAIL");
113         std::cout « std::endl;
114         throw;
115     }
116
```

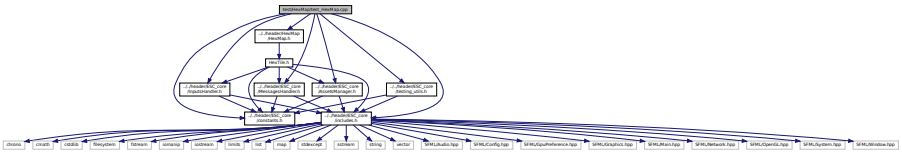
```
117
118     //...
119
120     printGold(" ");
121     for (int i = 0; i < n_dots; i++) {
122         printGold(".");
123     }
124     printGold(" ");
125     printGreen("PASS");
126     std::cout « std::endl;
127
128     return 0;
129 }   /* main() */
```

## 4.22 test/HexMap/test_HexMap.cpp File Reference

Suite of tests for the HexMap class.

```
#include "../../header/ESC_core/constants.h"
#include "../../header/ESC_core/includes.h"
#include "../../header/ESC_core/testing_utils.h"
#include "../../header/ESC_core/AssetsManager.h"
#include "../../header/ESC_core/InputsHandler.h"
#include "../../header/ESC_core/MessagesHandler.h"
#include "../../header/HexMap/HexMap.h"
```

Include dependency graph for test_HexMap.cpp:



### Functions

- int main (int argc, char **argv)

### 4.22.1 Detailed Description

Suite of tests for the HexMap class.

A suite of tests for the HexMap class.

### 4.22.2 Function Documentation

#### 4.22.2.1 main()

```
int main (
              int argc,
              char ** argv )
41 {
42     #ifdef _WIN32
43         activateVirtualTerminal();
44     #endif  /* _WIN32 */
45
46     printGold("\tTesting HexMap");
47     std::cout « std::endl;
48
49     srand(time(NULL));
50     int n_dots = 8;
51
52
53     try {
54         //  1. construct, load/open some test assets
55         AssetsManager assets_manager;
56         InputsHandler inputs_handler;
57         MessagesHandler messages_handler;
58
59         assets_manager.loadFont("assets/fonts/DroidSansMono.ttf", "DroidSansMono");
60
61
62         //  2. test game loop
63         sf::Clock clock;
64         sf::Event event;
65         sf::RenderWindow window(
66             sf::VideoMode(GAME_WIDTH, GAME_HEIGHT),
67             "Testing HexMap"
68         );
69
70         double screen_width = window.getSize().x;
71         double screen_height = window.getSize().y;
72
73         testFloatEquals(
74             screen_width,
75             1200,
76             __FILE__,
77             __LINE__
78         );
79
80         testFloatEquals(
81             screen_height,
82             800,
83             __FILE__,
84             __LINE__
85         );
86
87         unsigned long long int frame = 0;
88         double time_since_run_s = 0;
89
90         HexMap hex_map(
91             6,
92             &assets_manager,
93             &inputs_handler,
94             &messages_handler,
95             &window
96         );
97
98         while (window.isOpen()) {
99             time_since_run_s = clock.getElapsedTime().asSeconds();
100
101             if (
102                 time_since_run_s >= (frame + 1) * SECONDS_PER_FRAME
103             ) {
104                 while (window.pollEvent(event))
105                 {
106                     inputs_handler.process(&event);
107
108                     if (event.type == sf::Event::Closed) {
109                         window.close();
110                     }
111                 }
112
113                 hex_map.process();
114
115                 if (inputs_handler.key_pressed_once_vec[sf::Keyboard::Q]) {
116                     std::cout « "Q" « std::endl;
117                     hex_map.reroll();
118                 }
119
120                 if (inputs_handler.key_pressed_once_vec[sf::Keyboard::R]) {
```

```
121                     std::cout « "R" « std::endl;
122                     hex_map.toggleResourceOverlay();
123                 }
124 
125                 if (inputs_handler.key_pressed_once_vec[sf::Keyboard::A]) {
126                     std::cout « "A" « std::endl;
127                     hex_map.assess();
128                 }
129 
130                 window.clear();
131 
132                 hex_map.draw();
133 
134                 window.display();
135 
136                 inputs_handler.reset();
137 
138                 std::cout « frame « " : " « time_since_run_s « "\r" « std::flush;
139                 frame++;
140             }
141         }
142     }
143 
144 
145     catch (...) {
146         //...
147 
148         printGold(" ");
149         for (int i = 0; i < n_dots; i++) {
150             printGold(".");
151         }
152         printGold(" ");
153         printRed("FAIL");
154         std::cout « std::endl;
155         throw;
156     }
157 
158 
159     //...
160 
161     printGold(" ");
162     for (int i = 0; i < n_dots; i++) {
163         printGold(".");
164     }
165     printGold(" ");
166     printGreen("PASS");
167     std::cout « std::endl;
168 
169     return 0;
170 }   /* main() */
```

# Bibliography

L. Gomila. SFML: Simple and Fast Multimedia Library, 2023. URL https://www.sfml-dev.org/. 78

D. van Heesch. Doxygen: Generate documentation from source code, 2023. URL https://www.doxygen.nl. 77

Wikipedia. Hexagon, 2023. URL https://en.wikipedia.org/wiki/Hexagon. 51

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