

HelloWorld

Generated by Doxygen 1.9.1

1 Class Index	1
1.1 Class List	1
2 File Index	3
2.1 File List	3
3 Class Documentation	5
3.1 AssetsManager Class Reference	5
3.1.1 Detailed Description	6
3.1.2 Constructor & Destructor Documentation	6
3.1.2.1 AssetsManager()	6
3.1.2.2 ~AssetsManager()	7
3.1.3 Member Function Documentation	7
3.1.3.1 __loadSoundBuffer()	7
3.1.3.2 clear()	8
3.1.3.3 getCurrentTrackKey()	9
3.1.3.4 getFont()	9
3.1.3.5 getSound()	10
3.1.3.6 getSoundBuffer()	10
3.1.3.7 getTexture()	11
3.1.3.8 getTrackStatus()	11
3.1.3.9 loadFont()	12
3.1.3.10 loadSound()	12
3.1.3.11 loadTexture()	13
3.1.3.12 loadTrack()	14
3.1.3.13 nextTrack()	15
3.1.3.14 pauseTrack()	15
3.1.3.15 playTrack()	15
3.1.3.16 previousTrack()	15
3.1.3.17 stopTrack()	16
3.1.4 Member Data Documentation	16
3.1.4.1 current_track	16
3.1.4.2 font_map	16
3.1.4.3 sound_map	16
3.1.4.4 soundbuffer_map	16
3.1.4.5 texture_map	17
3.1.4.6 track_map	17
3.2 ContextMenu Class Reference	17
3.2.1 Detailed Description	19
3.2.2 Constructor & Destructor Documentation	19
3.2.2.1 ContextMenu()	19
3.2.2.2 ~ContextMenu()	20
3.2.3 Member Function Documentation	20

3.2.3.1	__drawConsoleScreenFrame()	20
3.2.3.2	__drawConsoleText()	21
3.2.3.3	__drawVisualScreenFrame()	21
3.2.3.4	__setConsoleState()	22
3.2.3.5	__setConsoleString()	22
3.2.3.6	__setUpConsoleScreen()	23
3.2.3.7	__setUpConsoleScreenFrame()	23
3.2.3.8	__setUpMenuFrame()	25
3.2.3.9	__setUpVisualScreen()	25
3.2.3.10	__setUpVisualScreenFrame()	26
3.2.3.11	draw()	27
3.2.3.12	process()	27
3.2.4	Member Data Documentation	28
3.2.4.1	address_int	28
3.2.4.2	address_string	29
3.2.4.3	assets_manager_ptr	29
3.2.4.4	console_screen	29
3.2.4.5	console_screen_frame_bottom	29
3.2.4.6	console_screen_frame_left	29
3.2.4.7	console_screen_frame_right	29
3.2.4.8	console_screen_frame_top	30
3.2.4.9	console_state	30
3.2.4.10	console_string	30
3.2.4.11	frame	30
3.2.4.12	game_menu_up	30
3.2.4.13	inputs_handler_ptr	30
3.2.4.14	menu_frame	31
3.2.4.15	messages_handler_ptr	31
3.2.4.16	position_x	31
3.2.4.17	position_y	31
3.2.4.18	render_window_ptr	31
3.2.4.19	visual_screen	31
3.2.4.20	visual_screen_frame_bottom	32
3.2.4.21	visual_screen_frame_left	32
3.2.4.22	visual_screen_frame_right	32
3.2.4.23	visual_screen_frame_top	32
3.3	HexMap Class Reference	32
3.3.1	Detailed Description	34
3.3.2	Constructor & Destructor Documentation	35
3.3.2.1	HexMap()	35
3.3.2.2	~HexMap()	35
3.3.3	Member Function Documentation	36

3.3.3.1 __assembleHexMap()	36
3.3.3.2 __enforceOceanContinuity()	36
3.3.3.3 __getMajorityTileType()	37
3.3.3.4 __getNeighboursVector()	38
3.3.3.5 __getNoise()	39
3.3.3.6 __getSelectedTile()	40
3.3.3.7 __getValidMapIndexPositions()	41
3.3.3.8 __isLakeTouchingOcean()	41
3.3.3.9 __layTiles()	42
3.3.3.10 __procedurallyGenerateTileResources()	44
3.3.3.11 __procedurallyGenerateTileTypes()	44
3.3.3.12 __sendDummySelectedMessage()	45
3.3.3.13 __setUpGlassScreen()	46
3.3.3.14 __smoothTileTypes()	46
3.3.3.15 assess()	46
3.3.3.16 clear()	47
3.3.3.17 draw()	47
3.3.3.18 process()	48
3.3.3.19 reroll()	48
3.3.3.20 toggleResourceOverlay()	48
3.3.4 Member Data Documentation	49
3.3.4.1 address_int	49
3.3.4.2 address_string	49
3.3.4.3 assets_manager_ptr	49
3.3.4.4 border_tiles_vec	49
3.3.4.5 frame	50
3.3.4.6 glass_screen	50
3.3.4.7 hex_map	50
3.3.4.8 inputs_handler_ptr	50
3.3.4.9 messages_handler_ptr	50
3.3.4.10 n_layers	50
3.3.4.11 n_tiles	51
3.3.4.12 position_x	51
3.3.4.13 position_y	51
3.3.4.14 render_window_ptr	51
3.3.4.15 tile_position_x_vec	51
3.3.4.16 tile_position_y_vec	51
3.4 HexTile Class Reference	52
3.4.1 Detailed Description	54
3.4.2 Constructor & Destructor Documentation	54
3.4.2.1 HexTile()	54
3.4.2.2 ~HexTile()	55

3.4.3 Member Function Documentation	55
3.4.3.1 __isClicked()	55
3.4.3.2 __setResourceText()	56
3.4.3.3 __setUpNodeSprite()	57
3.4.3.4 __setUpResourceChipSprite()	57
3.4.3.5 __setUpSelectOutlineSprite()	58
3.4.3.6 __setUpTileSprite()	58
3.4.3.7 assess()	58
3.4.3.8 draw()	59
3.4.3.9 emitSelectedMessage()	59
3.4.3.10 process()	60
3.4.3.11 setTileResource() [1/2]	60
3.4.3.12 setTileResource() [2/2]	61
3.4.3.13 setTileType() [1/2]	61
3.4.3.14 setTileType() [2/2]	62
3.4.3.15 toggleResourceOverlay()	63
3.4.4 Member Data Documentation	63
3.4.4.1 address_int	63
3.4.4.2 address_string	63
3.4.4.3 assets_manager_ptr	63
3.4.4.4 frame	64
3.4.4.5 inputs_handler_ptr	64
3.4.4.6 is_selected	64
3.4.4.7 major_radius	64
3.4.4.8 messages_handler_ptr	64
3.4.4.9 minor_radius	64
3.4.4.10 node_sprite	65
3.4.4.11 position_x	65
3.4.4.12 position_y	65
3.4.4.13 render_window_ptr	65
3.4.4.14 resource_assessed	65
3.4.4.15 resource_chip_sprite	65
3.4.4.16 resource_text	66
3.4.4.17 select_outline_sprite	66
3.4.4.18 show_node	66
3.4.4.19 show_resource	66
3.4.4.20 tile_resource	66
3.4.4.21 tile_sprite	66
3.4.4.22 tile_type	67
3.5 InputHandler Class Reference	67
3.5.1 Detailed Description	68
3.5.2 Constructor & Destructor Documentation	68

3.5.2.1 InputsHandler()	68
3.5.2.2 ~InputsHandler()	68
3.5.3 Member Function Documentation	68
3.5.3.1 __constructKeyCodeMap()	69
3.5.3.2 printKeysPressed()	72
3.5.3.3 process()	73
3.5.3.4 reset()	74
3.5.4 Member Data Documentation	74
3.5.4.1 key_code_map	74
3.5.4.2 key_press_vec	74
3.5.4.3 key_pressed_once_vec	74
3.5.4.4 mouse_left_click	74
3.5.4.5 mouse_right_click	75
3.6 Message Struct Reference	75
3.6.1 Detailed Description	75
3.6.2 Member Data Documentation	75
3.6.2.1 bool_payload_vec	76
3.6.2.2 channel	76
3.6.2.3 double_payload_vec	76
3.6.2.4 int_payload_vec	76
3.6.2.5 sender_address	76
3.6.2.6 sender_name	76
3.6.2.7 string_payload	77
3.6.2.8 subject	77
3.7 MessagesHandler Class Reference	77
3.7.1 Detailed Description	78
3.7.2 Constructor & Destructor Documentation	78
3.7.2.1 MessagesHandler()	78
3.7.2.2 ~MessagesHandler()	78
3.7.3 Member Function Documentation	78
3.7.3.1 addChannel()	78
3.7.3.2 clear()	79
3.7.3.3 isEmpty()	79
3.7.3.4 process()	80
3.7.3.5 receiveMessage()	80
3.7.3.6 removeChannel()	81
3.7.3.7 sendMessage()	81
3.7.4 Member Data Documentation	82
3.7.4.1 message_map	82
4 File Documentation	83
4.1 header/ContextMenu/ContextMenu.h File Reference	83

4.1.1 Detailed Description	84
4.1.2 Enumeration Type Documentation	84
4.1.2.1 ConsoleState	84
4.2 header/ESC_core/AssetsManager.h File Reference	84
4.2.1 Detailed Description	85
4.3 header/ESC_core/constants.h File Reference	85
4.3.1 Detailed Description	86
4.3.2 Function Documentation	87
4.3.2.1 FOREST_GREEN()	87
4.3.2.2 LAKE_BLUE()	87
4.3.2.3 MENU_FRAME_GREY()	87
4.3.2.4 MONOCHROME_SCREEN_BACKGROUND()	87
4.3.2.5 MONOCHROME_TEXT_AMBER()	88
4.3.2.6 MONOCHROME_TEXT_GREEN()	88
4.3.2.7 MONOCHROME_TEXT_RED()	88
4.3.2.8 MOUNTAINS_GREY()	88
4.3.2.9 OCEAN_BLUE()	88
4.3.2.10 PLAINS_YELLOW()	89
4.3.2.11 VISUAL_SCREEN_FRAME_GREY()	89
4.3.3 Variable Documentation	89
4.3.3.1 FLOAT_TOLERANCE	89
4.3.3.2 FRAMES_PER_SECOND	89
4.3.3.3 GAME_HEIGHT	89
4.3.3.4 GAME_WIDTH	90
4.3.3.5 MESSAGE_CHANNEL_SELECTED_TILE	90
4.3.3.6 SECONDS_PER_FRAME	90
4.3.3.7 TILE_RESOURCE_CUMULATIVE_PROBABILITIES	90
4.3.3.8 TILE_TYPE_CUMULATIVE_PROBABILITIES	90
4.4 header/ESC_core/doxygen_cite.h File Reference	91
4.4.1 Detailed Description	91
4.5 header/ESC_core/includes.h File Reference	91
4.5.1 Detailed Description	92
4.6 header/ESC_core/InputsHandler.h File Reference	92
4.6.1 Detailed Description	92
4.7 header/ESC_core/MessagesHandler.h File Reference	93
4.7.1 Detailed Description	93
4.8 header/ESC_core/testing_utils.h File Reference	93
4.8.1 Detailed Description	94
4.8.2 Function Documentation	94
4.8.2.1 expectedErrorNotDetected()	94
4.8.2.2 printGold()	95
4.8.2.3 printGreen()	95

4.8.2.4 printRed()	95
4.8.2.5 testFloatEquals()	96
4.8.2.6 testGreaterThan()	96
4.8.2.7 testGreaterThanOrEqualTo()	97
4.8.2.8 testLessThan()	98
4.8.2.9 testLessThanOrEqualTo()	98
4.8.2.10 testTruth()	99
4.9 header/HexMap/HexMap.h File Reference	100
4.9.1 Detailed Description	100
4.10 header/HexMap/HexTile.h File Reference	100
4.10.1 Detailed Description	101
4.10.2 Enumeration Type Documentation	101
4.10.2.1 TileResource	101
4.10.2.2 TileType	102
4.11 source/ContextMenu/ContextMenu.cpp File Reference	102
4.11.1 Detailed Description	102
4.12 source/ESC_core/AssetsManager.cpp File Reference	103
4.12.1 Detailed Description	103
4.13 source/ESC_core/InputsHandler.cpp File Reference	103
4.13.1 Detailed Description	103
4.14 source/ESC_core/MessagesHandler.cpp File Reference	103
4.14.1 Detailed Description	104
4.15 source/ESC_core/testing_utils.cpp File Reference	104
4.15.1 Detailed Description	104
4.15.2 Function Documentation	105
4.15.2.1 expectedErrorNotDetected()	105
4.15.2.2 printGold()	105
4.15.2.3 printGreen()	105
4.15.2.4 printRed()	106
4.15.2.5 testFloatEquals()	106
4.15.2.6 testGreaterThan()	107
4.15.2.7 testGreaterThanOrEqualTo()	107
4.15.2.8 testLessThan()	108
4.15.2.9 testLessThanOrEqualTo()	109
4.15.2.10 testTruth()	109
4.16 source/HexMap/HexMap.cpp File Reference	110
4.16.1 Detailed Description	110
4.17 source/HexMap/HexTile.cpp File Reference	110
4.17.1 Detailed Description	111
4.18 test/ContextMenu/test_ContextMenu.cpp File Reference	111
4.18.1 Detailed Description	111
4.18.2 Function Documentation	111

4.18.2.1 main()	112
4.19 test/ESC_core/test_AssetsManager.cpp File Reference	113
4.19.1 Detailed Description	114
4.19.2 Function Documentation	114
4.19.2.1 main()	114
4.20 test/ESC_core/test_InputsHandler.cpp File Reference	116
4.20.1 Detailed Description	117
4.20.2 Function Documentation	117
4.20.2.1 main()	117
4.21 test/ESC_core/test_MessagesHandler.cpp File Reference	119
4.21.1 Detailed Description	119
4.21.2 Function Documentation	119
4.21.2.1 main()	119
4.22 test/HexMap/test_HexMap.cpp File Reference	120
4.22.1 Detailed Description	121
4.22.2 Function Documentation	121
4.22.2.1 main()	121
Bibliography	125
Index	127

Chapter 1

Class Index

1.1 Class List

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

AssetsManager	A class which manages visual and sound assets	5
ContextMenu	A class which defines a context menu for the game	17
HexMap	A class which defines a hex map of hex tiles	32
HexTile	A class which defines a hex tile of the hex map	52
InputsHandler	A class which handles inputs from peripherals (i.e., keyboard and mouse)	67
Message	A structure which defines a standard message format	75
MessagesHandler	A class which handles message traffic between game objects	77

Chapter 2

File Index

2.1 File List

Here is a list of all files with brief descriptions:

header/ContextMenu/ ContextMenu.h	
Header file for the ContextMenu class	83
header/ESC_core/ AssetsManager.h	
Header file for the AssetsManager class	84
header/ESC_core/ constants.h	
Header file for various constants	85
header/ESC_core/ doxygen_cite.h	
Header file which simply cites the doxygen tool	91
header/ESC_core/ includes.h	
Header file for various includes	91
header/ESC_core/ InputsHandler.h	
Header file for the InputsHandler class	92
header/ESC_core/ MessagesHandler.h	
Header file for the MessagesHandler class	93
header/ESC_core/ testing_utils.h	
Header file for various testing utilities	93
header/HexMap/ HexMap.h	
Header file for the HexMap class	100
header/HexMap/ HexTile.h	
Header file for the HexTile class	100
source/ContextMenu/ ContextMenu.cpp	
Implementation file for the ContextMenu class	102
source/ESC_core/ AssetsManager.cpp	
Implementation file for the AssetsManager class	103
source/ESC_core/ InputsHandler.cpp	
Implementation file for the InputsHandler class	103
source/ESC_core/ MessagesHandler.cpp	
Implementation file for the MessagesHandler class	103
source/ESC_core/ testing_utils.cpp	
Implementation file for various testing utilities	104
source/HexMap/ HexMap.cpp	
Implementation file for the HexMap class	110
source/HexMap/ HexTile.cpp	
Implementation file for the HexTile class	110
test/ContextMenu/ test_ContextMenu.cpp	
Suite of tests for the ContextMenu class	111

test/ESC_core/ test_AssetsManager.cpp	
Suite of tests for the AssetsManager class	113
test/ESC_core/ test_InputsHandler.cpp	
Suite of tests for the InputsHandler class	116
test/ESC_core/ test_MessagesHandler.cpp	
Suite of tests for the MessagesHandler class	119
test/HexMap/ test_HexMap.cpp	
Suite of tests for the HexMap class	120

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

<i>path_2_sound</i>	A path (either relative or absolute) to the sound file.
<i>sound_key</i>	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     // 2. clear textures
662     std::map<std::string, sf::Texture*>::iterator texture_iter;
663     for (
664         texture_iter = this->texture_map.begin();
665         texture_iter != this->texture_map.end();
666         texture_iter++
667     ) {
668         delete texture_iter->second;
669
670         std::cout << "Texture " << texture_iter->first << " deleted from texture map" <<
671             std::endl;
672     }
673     this->texture_map.clear();
674
675     // 3. clear sound buffers
676     std::map<std::string, sf::SoundBuffer*>::iterator soundbuffer_iter;
677     for (
678         soundbuffer_iter = this->soundbuffer_map.begin();
679         soundbuffer_iter != this->soundbuffer_map.end();
680         soundbuffer_iter++
681     ) {
682         delete soundbuffer_iter->second;
683
684         std::cout << "SoundBuffer " << soundbuffer_iter->first <<
685             " deleted from soundbuffer map" << std::endl;
686     }
687     this->soundbuffer_map.clear();
688
689     // 4. clear sounds
690     std::map<std::string, sf::Sound*>::iterator sound_iter;
691     for (
692         sound_iter = this->sound_map.begin();
693         sound_iter != this->sound_map.end();
694         sound_iter++
695     ) {
696         sound_iter->second->stop();
697         delete sound_iter->second;
698
699         std::cout << "Sound " << sound_iter->first << " deleted from sound map" <<
700             std::endl;
701     }
702     this->sound_map.clear();
703
704 }

```

```

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

<i>font_key</i>	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

<i>sound_key</i>	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

<i>sound_key</i>	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

<i>texture_key</i>	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

<i>path_2_font</i>	A path (either relative or absolute) to the font file.
<i>font_key</i>	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     // 2. load from file, throw error on fail
152     sf::Font* font_ptr = new sf::Font();
153
154     if (not font_ptr->loadFromFile(path_2_font)) {
155         std::string error_str = "ERROR AssetsManager::loadFont() could not load ";
156         error_str += "font at ";
157         error_str += path_2_font;
158
159         this->clear();
160
161         #ifdef _WIN32
162             std::cout << error_str << std::endl;
163         #endif /* _WIN32 */
164
165         throw std::runtime_error(error_str);
166     }
167
168     // 3. insert into font map
169     this->font_map.insert(std::pair<std::string, sf::Font*>(font_key, font_ptr));
170
171     std::cout << "Font " << font_key << " inserted into font map" << std::endl;
172
173     return;
174 } /* 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

<i>path_2_sound</i>	A path (either relative or absolute) to the sound file.
<i>sound_key</i>	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

<i>path_2_texture</i>	A path (either relative or absolute) to the texture file.
<i>texture_key</i>	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     // 2. load from file, throw error on fail
213     sf::Texture* texture_ptr = new sf::Texture();
214
215     if (not texture_ptr->loadFromFile(path_2_texture)) {
216         std::string error_str = "ERROR AssetsManager::loadTexture() could not load ";
217         error_str += "texture at ";
218         error_str += path_2_texture;
219
220         this->clear();
221
222         #ifdef _WIN32
223             std::cout << error_str << std::endl;
224         #endif
```

```

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

<i>path_2_track</i>	A path (either relative or absolute) to the track file.
<i>track_key</i>	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:

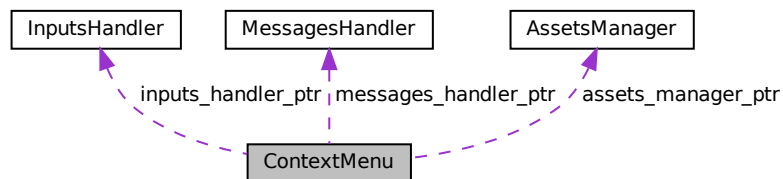
- header/ESC_core/[AssetsManager.h](#)
- source/ESC_core/[AssetsManager.cpp](#)

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 event.
- 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

- [ConsoleState console_state](#)
The current state of the console screen.
- [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_string](#)
The string 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 \(void\)](#)

- `void __drawConsoleScreenFrame (void)`
Helper method to set up framing for context menu console screen (drawable).
- `void __setConsoleState (ConsoleState)`
Helper method to draw console screen frame.
- `void __setConsoleString (void)`
Helper method to set state of console screen and update string if necessary.
- `void __drawConsoleText (void)`
Helper method to set console string depending on console state.
- `void __drawConsoleText (void)`
Helper method to draw animated text to context menu console screen.

Private Attributes

- unsigned long long int `address_int`
An int representation of the memory address of this object.
- std::string `address_string`
A string representation of the hex address of this object.
- `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

<code>assets_manager_ptr</code>	Pointer to the assets manager.
<code>inputs_handler_ptr</code>	Pointer to the inputs handler.
<code>messages_handler_ptr</code>	Pointer to the messages handler.
<code>render_window_ptr</code>	Pointer to the render window.

```

641 {
642     // 1. set attributes
643     this->address_int = (unsigned long long int)this;
644
645     std::stringstream ss;
646     ss << std::hex << this;
647     this->address_string = ss.str();
648
649     this->assets_manager_ptr = assets_manager_ptr;
650     this->inputs_handler_ptr = inputs_handler_ptr;
651     this->messages_handler_ptr = messages_handler_ptr;
652     this->render_window_ptr = render_window_ptr;
653
654     this->console_state = ConsoleState :: NONE;
655     this->__setConsoleState(ConsoleState :: READY);
656
657     this->game_menu_up = false;
658
659     this->frame = 0;
660
661     this->position_x = GAME_WIDTH;
662     this->position_y = 0;
663
664     // 2. set up and position drawable attributes
665     this->__setUpMenuFrame();
666     this->__setUpVisualScreen();
667     this->__setUpVisualScreenFrame();
668     this->__setUpConsoleScreen();
669     this->__setUpConsoleScreenFrame();
670
671     std::cout << "ContextMenu constructed at " << this << " (" << this->address_int
672         << ")" << std::endl;
673
674     return;
675 } /* ContextMenu() */

```

3.2.2.2 ~ContextMenu()

```

ContextMenu::~~ContextMenu (
    void )

```

Destructor for the [ContextMenu](#) class.

```

805 {
806     std::cout << "ContextMenu at " << this << " (" << this->address_int
807         << ") destroyed" << std::endl;
808
809     return;
810 } /* ~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.

```
548 {
549     // 1. set up console text (drawable)
550     sf::Text console_text(
551         this->console_string,
552         *(assets_manager_ptr->getFont("Glass_TTY_VT220")),
553         16
554     );
555
556     console_text.setFillColor(MONOCROME_TEXT_GREEN);
557
558     console_text.setPosition(
559         this->position_x - 50 - 300 + 16,
560         this->position_y + GAME_HEIGHT - 50 - 340 + 16
561     );
562
563
564     // 2. draw console text
565     this->render_window_ptr->draw(console_text);
566
567
568     // 3. assemble and draw blinking console cursor
569     if ((this->frame % FRAMES_PER_SECOND) > FRAMES_PER_SECOND / 2) {
570         sf::RectangleShape console_cursor(sf::Vector2f(10, 16));
571
572         console_cursor.setFillColor(MONOCROME_TEXT_GREEN);
573
574         console_cursor.setPosition(
575             console_text.getPosition().x,
576             console_text.getPosition().y + console_text.getLocalBounds().height + 10
577         );
578
579         this->render_window_ptr->draw(console_cursor);
580     }
581
582     // 4. updating frame count if console is in menu state
583     if (this->console_state == ConsoleState::MENU) {
584         std::string frame_count_string = "FRAME: ";
585         frame_count_string += std::to_string(this->frame);
586
587         sf::Text frame_count_text(
588             frame_count_string,
589             *(assets_manager_ptr->getFont("Glass_TTY_VT220")),
590             16
591         );
592
593         frame_count_text.setFillColor(MONOCROME_TEXT_GREEN);
594
595         frame_count_text.setPosition(
596             console_text.getPosition().x,
597             console_text.getPosition().y + console_text.getLocalBounds().height - 10
598         );
599
600         this->render_window_ptr->draw(frame_count_text);
601     }
602
603     return;
604 } /* __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 __setConsoleState()

```
void ContextMenu::__setConsoleState (
    ConsoleState console_state ) [private]
```

Helper method to set state of console screen and update string if necessary.

Parameters

<i>console_state</i>	The state (ConsoleState) to set the console to.
----------------------	---

```
457 {
458     // 1. if no change, do nothing
459     if (this->console_state == console_state) {
460         return;
461     }
462
463     // 2. update console state, set console string accordingly
464     this->console_state = console_state;
465     this->__setConsoleString();
466
467     return;
468 } /* __setConsoleState() */
```

3.2.3.5 __setConsoleString()

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

Helper method to set console string depending on console state.

```
483 {
484     this->console_string.clear();
485
486     switch (this->console_state) {
487         case (ConsoleState :: MENU): {
488             // 32 char x 17 line console "-----\n";
489             this->console_string = "          **** MENU **** \n";
490             this->console_string += " \n";
491             this->console_string += "[T]:  TUTORIAL \n";
492             this->console_string += " \n";
493             this->console_string += "[R]:  RESTART \n";
494             this->console_string += " \n";
495             this->console_string += " \n";
496             this->console_string += " \n";
497             this->console_string += " \n";
498             this->console_string += " \n";
499             this->console_string += " \n";
500             this->console_string += " \n";
501             this->console_string += "[Q]:   QUIT \n";
502             this->console_string += " \n";
503             this->console_string += "[ESC]: CLOSE MENU \n";
504             this->console_string += " \n";
505
506             break;
507         }
508
509         case (ConsoleState :: TILE): {
510             // console string set from tile message
511
512             break;
513         }
514     }
515
516     default: {
517         // 32 char x 17 line console "-----\n";
518         this->console_string = "    **** RTZ 64 CONTEXT V12 **** \n";
519         this->console_string += " \n";
520         this->console_string += "64K RAM SYSTEM  38911 BYTES FREE\n";
521         this->console_string += " \n";
522         this->console_string += "[ESC]:          MENU \n";
523         this->console_string += "[LEFT CLICK]: TILE INFO/OPTIONS \n";
524     }
```



```

525         this->console_string += "
526         this->console_string += "READY.
527
528         break;
529     }
530 }
531
532 return;
533 } /* __setConsoleString() */

```

3.2.3.6 __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() */

```

3.2.3.7 __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() */

```

3.2.3.8 __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() */

```

3.2.3.9 __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() */

```

3.2.3.10 __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 }
```

```

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() */

```

3.2.3.11 draw()

```

void ContextMenu::draw (
    void )

```

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

```

775 {
776     // 1. menu frame
777     this->render_window_ptr->draw(this->menu_frame);
778
779     // 2. visual screen
780     this->render_window_ptr->draw(this->visual_screen);
781     this->__drawVisualScreenFrame();
782
783     // 3. console screen
784     this->render_window_ptr->draw(this->console_screen);
785     this->__drawConsoleScreenFrame();
786     this->__drawConsoleText();
787
788     this->frame++;
789     return;
790 } /* draw() */

```

3.2.3.12 process()

```

void ContextMenu::process (
    void )

```

Method to process [ContextMenu](#). To be called once per event.

```

698 {

```

```

699 // 1. handle inputs
700 if (this->inputs_handler_ptr->key_pressed_once_vec[sf::Keyboard::Escape]) {
701     switch (this->console_state) {
702         case (ConsoleState :: MENU): {
703             this->__setConsoleState(ConsoleState :: READY);
704
705             break;
706         }
707
708         default: {
709             this->__setConsoleState(ConsoleState :: MENU);
710
711             break;
712         }
713     }
714 }
715 }
716
717
718 if (this->inputs_handler_ptr->key_pressed_once_vec[sf::Keyboard::Q]) {
719     switch (this->console_state) {
720         case (ConsoleState :: MENU): {
721             this->render_window_ptr->close();
722
723             break;
724         }
725
726         default: {
727             // do nothing!
728
729             break;
730         }
731     }
732 }
733 }
734
735
736 if (this->inputs_handler_ptr->mouse_left_click) {
737     if (not this->messages_handler_ptr->isEmpty(MESSAGE_CHANNEL_SELECTED_TILE)) {
738         Message selected_message = this->messages_handler_ptr->receiveMessage(
739             MESSAGE_CHANNEL_SELECTED_TILE
740         );
741
742         if (selected_message.subject == "DUMMY") {
743             this->__setConsoleState(ConsoleState :: READY);
744         }
745
746         else {
747             this->__setConsoleState(ConsoleState :: TILE);
748             this->console_string = selected_message.string_payload;
749         }
750     }
751 }
752
753
754 if (this->inputs_handler_ptr->mouse_right_click) {
755     this->__setConsoleState(ConsoleState :: READY);
756 }
757
758 return;
759 } /* process() */

```

3.2.4 Member Data Documentation

3.2.4.1 address_int

unsigned long long int ContextMenu::address_int [private]

An int representation of the memory address of this object.

3.2.4.2 address_string

```
std::string ContextMenu::address_string [private]
```

A string representation of the hex address of this object.

3.2.4.3 assets_manager_ptr

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

A pointer to the assets manager.

3.2.4.4 console_screen

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

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

3.2.4.5 console_screen_frame_bottom

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

The bottom framing of the console screen.

3.2.4.6 console_screen_frame_left

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

The left framing of the console screen.

3.2.4.7 console_screen_frame_right

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

The right framing of the console screen.

3.2.4.8 console_screen_frame_top

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

The top framing of the console screen.

3.2.4.9 console_state

```
ConsoleState ContextMenu::console_state
```

The current state of the console screen.

3.2.4.10 console_string

```
std::string ContextMenu::console_string
```

The string to be printed to the console screen.

3.2.4.11 frame

```
int ContextMenu::frame
```

The current frame of this object.

3.2.4.12 game_menu_up

```
bool ContextMenu::game_menu_up
```

Indicates whether or not the game menu is up.

3.2.4.13 inputs_handler_ptr

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

A pointer to the inputs handler.

3.2.4.14 menu_frame

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

The frame of the context menu.

3.2.4.15 messages_handler_ptr

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

A pointer to the messages handler.

3.2.4.16 position_x

```
double ContextMenu::position_x
```

The position of the object.

3.2.4.17 position_y

```
double ContextMenu::position_y
```

The position of the object.

3.2.4.18 render_window_ptr

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

A pointer to the render window.

3.2.4.19 visual_screen

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

The context menu screen for visuals.

3.2.4.20 visual_screen_frame_bottom

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

The bottom framing of the visual screen.

3.2.4.21 visual_screen_frame_left

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

The left framing of the visual screen.

3.2.4.22 visual_screen_frame_right

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

The right framing of the visual screen.

3.2.4.23 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:

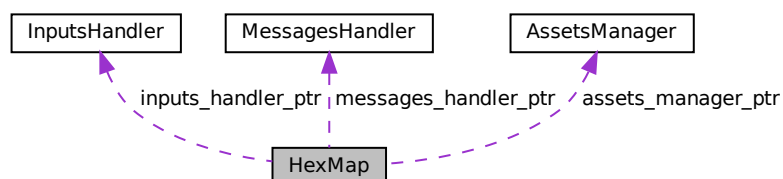
- header/ContextMenu/[ContextMenu.h](#)
- source/ContextMenu/[ContextMenu.cpp](#)

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)
Helper method to set up glass screen effect (drawable).
- 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.
- void [__sendDummySelectedMessage](#) (void)
Method to format and emit a dummy message when no tile is selected.

Private Attributes

- unsigned long long int [address_int](#)
An int representation of the memory address of this object.
- std::string [address_string](#)
A string representation of the hex address of this object.
- [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

<i>n_layers</i>	The number of layers in the HexMap .
<i>assets_manager_ptr</i>	Pointer to the assets manager.
<i>inputs_handler_ptr</i>	Pointer to the inputs handler.
<i>messages_handler_ptr</i>	Pointer to the messages handler.
<i>render_window_ptr</i>	Pointer to the render window.

```
908 {
909     // 1. set attributes
910     this->address_int = (unsigned long long int)this;
911
912     std::stringstream ss;
913     ss << std::hex << this;
914     this->address_string = ss.str();
915
916     this->assets_manager_ptr = assets_manager_ptr;
917     this->inputs_handler_ptr = inputs_handler_ptr;
918     this->messages_handler_ptr = messages_handler_ptr;
919     this->render_window_ptr = render_window_ptr;
920
921     this->frame = 0;
922
923     this->n_layers = n_layers;
924     if (this->n_layers < 0) {
925         this->n_layers = 0;
926     }
927
928     this->position_x = 400;
929     this->position_y = 400;
930
931     // 2. assemble n layer hex map
932     this->__assembleHexMap();
933
934     // 3. set up and position drawable attributes
935     this->__setUpGlassScreen();
936
937     // 4. add message channel(s)
938     this->messages_handler_ptr->addChannel(MESSAGE_CHANNEL_SELECTED_TILE);
939
940     std::cout << "HexMap constructed at " << this << " (" << this->address_int
941         << ")" << std::endl;
942
943     return;
944 } /* HexMap() */
```

3.3.2.2 ~HexMap()

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

Destructor for the [HexMap](#) class.

```

1162 {
1163     this->clear();
1164
1165     std::cout << "HexMap at " << this << " (" << this->address_int
1166         << ") destroyed" << std::endl;
1167
1168     return;
1169 } /* ~HexMap() */

```

3.3.3 Member Function Documentation

3.3.3.1 __assembleHexMap()

```

void HexMap::__assembleHexMap (
    void ) [private]

```

Helper method to assemble the hex map.

```

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

```

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

```

```

689
690         if (this->__isLakeTouchingOcean(hex_ptr)) {
691             hex_ptr->setTileType(TileType:: OCEAN);
692             tile_changed = true;
693         }
694     }
695 }
696
697 if (tile_changed) {
698     this->__enforceOceanContinuity();
699 }
700 else {
701     return;
702 }
703 } /* __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

<i>hex_ptr</i>	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.

```

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

```

```

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

<i>hex_ptr</i>	A pointer to the given tile.
----------------	------------------------------

Returns

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

```

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

<i>n_elements</i>	The number of elements in the generated noise vector.
<i>n_components</i>	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].

```
247 {
248     // 1. generate random amplitude, wave number, direction, and phase vectors
249     std::vector<double> random_amplitude_vec(n_components, 0);
250     std::vector<double> random_wave_number_vec(n_components, 0);
251     std::vector<double> random_frequency_vec(n_components, 0);
252     std::vector<double> random_direction_vec(n_components, 0);
253     std::vector<double> random_phase_vec(n_components, 0);
254
255     for (int i = 0; i < n_components; i++) {
256         random_amplitude_vec[i] = 10 * ((double)rand() / RAND_MAX);
257
258         random_wave_number_vec[i] = 2 * M_PI * ((double)rand() / RAND_MAX);
259
260         random_frequency_vec[i] = ((double)rand() / RAND_MAX);
261
262         random_direction_vec[i] = 2 * M_PI * ((double)rand() / RAND_MAX);
263
264         random_phase_vec[i] = 2 * M_PI * ((double)rand() / RAND_MAX);
265     }
266
267     // 2. generate noise vec
268     double amp = 0;
269     double wave_no = 0;
270     double freq = 0;
271     double dir = 0;
272     double phase = 0;
273
274     double x = 0;
275     double y = 0;
276     double t = time(NULL);
277
278     double max_noise = -1 * std::numeric_limits<double>::infinity();
279     double min_noise = std::numeric_limits<double>::infinity();
280
281     double noise = 0;
282     std::vector<double> noise_vec(n_elements, 0);
283
284     for (int i = 0; i < n_elements; i++) {
285         x = this->tile_position_x_vec[i] - this->position_x;
286         y = this->tile_position_y_vec[i] - this->position_y;
287
288         for (int j = 0; j < n_components; j++) {
289             amp = random_amplitude_vec[j];
290             wave_no = random_wave_number_vec[j];
291             freq = random_frequency_vec[j];
292             dir = random_direction_vec[j];
293             phase = random_phase_vec[j];
294
295             noise += (amp / (j + 1)) * cos(
296                 wave_no * (j + 1) * (x * sin(dir) + y * cos(dir)) +
297                 2 * M_PI * (j + 1) * freq * t +
298                 phase
299             );
300         }
301
302         noise_vec[i] = noise;
303
304         if (noise > max_noise) {
```

```

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

```

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

<i>potential_x</i>	The potential x position of the tile.
<i>potential_y</i>	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.

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

3.3.3.8 `__isLakeTouchingOcean()`

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

```

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

```

3.3.3.9 __layTiles()

```

void HexMap::__layTiles (
    void ) [private]

```

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

```

54 {
55     this->n_tiles = 0;
56
57     // 1. add origin tile
58     HexTile* hex_ptr = new HexTile(
59         this->position_x,
60         this->position_y,
61         this->assets_manager_ptr,
62         this->inputs_handler_ptr,
63         this->messages_handler_ptr,
64         this->render_window_ptr
65     );
66
67     this->hex_map[this->position_x][this->position_y] = hex_ptr;
68     this->tile_position_x_vec.push_back(hex_ptr->position_x);
69     this->tile_position_y_vec.push_back(hex_ptr->position_y);
70     this->n_tiles++;
71
72
73     // 2. fill out first row (reflect across origin tile)
74     for (int i = 0; i < this->n_layers; i++) {
75         hex_ptr = new HexTile(
76             this->position_x + 2 * (i + 1) * hex_ptr->minor_radius,
77             this->position_y,
78             this->assets_manager_ptr,
79             this->inputs_handler_ptr,
80             this->messages_handler_ptr,
81             this->render_window_ptr
82         );
83
84         this->hex_map[this->position_x][this->position_y] = hex_ptr;
85         this->tile_position_x_vec.push_back(hex_ptr->position_x);
86         this->tile_position_y_vec.push_back(hex_ptr->position_y);
87         this->n_tiles++;
88
89         if (i == this->n_layers - 1) {
90             this->border_tiles_vec.push_back(hex_ptr);
91         }
92
93         hex_ptr = new HexTile(
94             this->position_x - 2 * (i + 1) * hex_ptr->minor_radius,
95             this->position_y,
96             this->assets_manager_ptr,
97             this->inputs_handler_ptr,
98             this->messages_handler_ptr,
99             this->render_window_ptr
100         );
101
102         this->hex_map[this->position_x][this->position_y] = hex_ptr;
103         this->tile_position_x_vec.push_back(hex_ptr->position_x);
104         this->tile_position_y_vec.push_back(hex_ptr->position_y);
105         this->n_tiles++;
106
107         if (i == this->n_layers - 1) {
108             this->border_tiles_vec.push_back(hex_ptr);
109         }
110     }
111
112
113     // 3. fill out subsequent rows (reflect across first row)
114     HexTile* first_row_left_tile = hex_ptr;
115

```

```

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

```

```

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

```

3.3.3.10 __procedurallyGenerateTileResources()

```

void HexMap::__procedurallyGenerateTileResources (
    void ) [private]

```

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

```

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

```

3.3.3.11 __procedurallyGenerateTileTypes()

```

void HexMap::__procedurallyGenerateTileTypes (
    void ) [private]

```

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

```

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

```

```

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

```

3.3.3.12 __sendDummySelectedMessage()

```

void HexMap::__sendDummySelectedMessage (
    void ) [private]

```

Method to format and emit a dummy message when no tile is selected.

```

841 {
842     // 1. check if last message sent was dummy (if so, do nothing)
843     if (not this->messages_handler_ptr->isEmpty(MESSAGE_CHANNEL_SELECTED_TILE)) {
844         Message message = this->messages_handler_ptr->receiveMessage(
845             MESSAGE_CHANNEL_SELECTED_TILE
846         );
847
848         if (message.subject == "DUMMY") {
849             return;
850         }
851     }
852
853     // 2. format message header
854     Message dummy_message;
855
856     dummy_message.sender_name = "HexMap";
857     dummy_message.sender_address = this->address_int;
858     dummy_message.subject = "DUMMY";
859     dummy_message.channel = MESSAGE_CHANNEL_SELECTED_TILE;
860
861     // 3. send message
862     this->messages_handler_ptr->sendMessage(dummy_message);
863
864     std::cout << "HexMap at " << this << " emitted dummy (selected) message" << std::endl;
865
866     return;
867 } /* __sendDummySelectedMessage() */

```

3.3.3.13 __setUpGlassScreen()

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

Helper method to set up glass screen effect (drawable).

```
34 {
35     this->glass_screen.setSize(sf::Vector2f(GAME_WIDTH, GAME_HEIGHT));
36     this->glass_screen.setFillColor(sf::Color(40, 40, 40, 40));
37
38     return;
39 } /* __setUpGlassScreen() */
```

3.3.3.14 __smoothTileTypes()

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

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

```
589 {
590     std::cout << "smoothing ..." << std::endl;
591
592     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
593     std::map<double, HexTile*>::iterator hex_map_iter_y;
594     HexTile* hex_ptr;
595     TileType majority_tile_type;
596
597     for (
598         hex_map_iter_x = this->hex_map.begin();
599         hex_map_iter_x != this->hex_map.end();
600         hex_map_iter_x++
601     ) {
602         for (
603             hex_map_iter_y = hex_map_iter_x->second.begin();
604             hex_map_iter_y != hex_map_iter_x->second.end();
605             hex_map_iter_y++
606         ) {
607             hex_ptr = hex_map_iter_y->second;
608             majority_tile_type = this->__getMajorityTileType(hex_ptr);
609
610             if (majority_tile_type != hex_ptr->tile_type) {
611                 hex_ptr->setTileType(majority_tile_type);
612             }
613         }
614     }
615
616     return;
617 } /* __smoothTileTypes() */
```

3.3.3.15 assess()

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

Method to assess the resource of the selected tile.

```
959 {
960     HexTile* selected_tile_ptr = this->__getSelectedTile();
961     if (selected_tile_ptr != NULL) {
962         selected_tile_ptr->assess();
963     }
964
965     return;
966 } /* assess() */
```


3.3.3.16 clear()

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

Method to clear the hex map.

```
1124 {
1125     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
1126     std::map<double, HexTile*>::iterator hex_map_iter_y;
1127     for (
1128         hex_map_iter_x = this->hex_map.begin();
1129         hex_map_iter_x != this->hex_map.end();
1130         hex_map_iter_x++
1131     ) {
1132         for (
1133             hex_map_iter_y = hex_map_iter_x->second.begin();
1134             hex_map_iter_y != hex_map_iter_x->second.end();
1135             hex_map_iter_y++
1136         ) {
1137             delete hex_map_iter_y->second;
1138         }
1139     }
1140     this->hex_map.clear();
1141
1142     this->tile_position_x_vec.clear();
1143     this->tile_position_y_vec.clear();
1144     this->border_tiles_vec.clear();
1145
1146     return;
1147 } /* clear() */
```

3.3.3.17 draw()

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

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

```
1080 {
1081     // 1. draw all tiles in order
1082     std::map<double, std::map<double, HexTile*>::iterator hex_map_iter_x;
1083     std::map<double, HexTile*>::iterator hex_map_iter_y;
1084     for (
1085         hex_map_iter_x = this->hex_map.begin();
1086         hex_map_iter_x != this->hex_map.end();
1087         hex_map_iter_x++
1088     ) {
1089         for (
1090             hex_map_iter_y = hex_map_iter_x->second.begin();
1091             hex_map_iter_y != hex_map_iter_x->second.end();
1092             hex_map_iter_y++
1093         ) {
1094             hex_map_iter_y->second->draw();
1095         }
1096     }
1097
1098     // 2. redraw selected tile
1099     HexTile* selected_tile_ptr = this->__getSelectedTile();
1100     if (selected_tile_ptr != NULL) {
1101         selected_tile_ptr->draw();
1102     }
1103
1104     // 3. draw glass screen
1105     this->render_window_ptr->draw(this->glass_screen);
1106
1107     this->frame++;
1108     return;
1109 } /* draw() */
```

3.3.3.18 process()

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

Method to process [HexMap](#). To be called once per frame.

```
981 {
982     // 1. process tiles
983     std::map<double, std::map<double, HexTile*>>::iterator hex_map_iter_x;
984     std::map<double, HexTile*>::iterator hex_map_iter_y;
985     for (
986         hex_map_iter_x = this->hex_map.begin();
987         hex_map_iter_x != this->hex_map.end();
988         hex_map_iter_x++
989     ) {
990         for (
991             hex_map_iter_y = hex_map_iter_x->second.begin();
992             hex_map_iter_y != hex_map_iter_x->second.end();
993             hex_map_iter_y++
994         ) {
995             hex_map_iter_y->second->process();
996         }
997     }
998
999     // 2. handle inputs
1000     if (inputs_handler_ptr->mouse_left_click) {
1001         HexTile* selected_hex_ptr = __getSelectedTile();
1002
1003         if (selected_hex_ptr != NULL) {
1004             selected_hex_ptr->emitSelectedMessage();
1005         }
1006         else {
1007             this->__sendDummySelectedMessage();
1008         }
1009     }
1010
1011     return;
1012 } /* process() */
```

3.3.3.19 reroll()

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

Method to re-roll the hex map.

```
1027 {
1028     this->clear();
1029     this->__assembleHexMap();
1030
1031     return;
1032 } /* reroll() */
```

3.3.3.20 toggleResourceOverlay()

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

Method to toggle the hex map resource overlay.

```
1047 {
1048     std::map<double, std::map<double, HexTile*>>::iterator hex_map_iter_x;
1049     std::map<double, HexTile*>::iterator hex_map_iter_y;
1050     for (
1051         hex_map_iter_x = this->hex_map.begin();
1052         hex_map_iter_x != this->hex_map.end();
1053         hex_map_iter_x++
1054     ) {
```

```
1055         for (
1056             hex_map_iter_y = hex_map_iter_x->second.begin();
1057             hex_map_iter_y != hex_map_iter_x->second.end();
1058             hex_map_iter_y++)
1059         ) {
1060             hex_map_iter_y->second->toggleResourceOverlay();
1061         }
1062     }
1063
1064     return;
1065 } /* toggleResourceOverlay() */
```

3.3.4 Member Data Documentation

3.3.4.1 address_int

```
unsigned long long int HexMap::address_int [private]
```

An int representation of the memory address of this object.

3.3.4.2 address_string

```
std::string HexMap::address_string [private]
```

A string representation of the hex address of this object.

3.3.4.3 assets_manager_ptr

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

A pointer to the assets manager.

3.3.4.4 border_tiles_vec

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

A vector of pointers to the border tiles.

3.3.4.5 frame

```
int HexMap::frame
```

The current frame of this object.

3.3.4.6 glass_screen

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

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

3.3.4.7 hex_map

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

A position-indexed, nested map of hex tiles.

3.3.4.8 inputs_handler_ptr

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

A pointer to the inputs handler.

3.3.4.9 messages_handler_ptr

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

A pointer to the messages handler.

3.3.4.10 n_layers

```
int HexMap::n_layers
```

The number of layers in the hex map.

3.3.4.11 n_tiles

```
int HexMap::n_tiles
```

The number of tiles in the hex map.

3.3.4.12 position_x

```
double HexMap::position_x
```

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

3.3.4.13 position_y

```
double HexMap::position_y
```

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

3.3.4.14 render_window_ptr

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

A pointer to the render window.

3.3.4.15 tile_position_x_vec

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

A vector of tile x positions.

3.3.4.16 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:

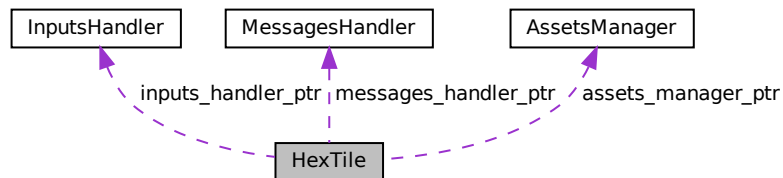
- header/HexMap/[HexMap.h](#)
- source/HexMap/[HexMap.cpp](#)

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 [emitSelectedMessage](#) (void)
Method to format and emit message when selected.
- 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

- unsigned long long int [address_int](#)
An int representation of the memory address of this object.
- std::string [address_string](#)
A string representation of the memory address of this object.
- [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

<i>position_x</i>	The x position of the tile.
<i>position_y</i>	The y position of the tile.
<i>assets_manager_ptr</i>	Pointer to the assets manager.
<i>inputs_handler_ptr</i>	Pointer to the inputs handler.
<i>messages_handler_ptr</i>	Pointer to the messages handler.
<i>render_window_ptr</i>	Pointer to the render window.

```
300 {
301     // 1. set attributes
302     this->address\_int = (unsigned long long int)this;
```



```

303
304     std::stringstream ss;
305     ss << std::hex << this;
306     this->address_string = ss.str();
307
308     this->assets_manager_ptr = assets_manager_ptr;
309     this->inputs_handler_ptr = inputs_handler_ptr;
310     this->messages_handler_ptr = messages_handler_ptr;
311     this->render_window_ptr = render_window_ptr;
312
313     this->show_node = false;
314     this->show_resource = false;
315     this->resource_assessed = false;
316     this->is_selected = false;
317
318     this->frame = 0;
319
320     this->position_x = position_x;
321     this->position_y = position_y;
322
323     this->major_radius = 32;
324     this->minor_radius = (sqrt(3) / 2) * this->major_radius;
325
326     // 2. set up and position drawable attributes
327     this->__setUpNodeSprite();
328     this->__setUpTileSprite();
329     this->__setUpSelectOutlineSprite();
330     this->__setUpResourceChipSprite();
331     this->__setUpResourceText();
332
333     // 3. set tile type and resource (default to forest and average)
334     this->setTileType(TileType :: FOREST);
335     this->setTileResource(TileResource :: AVERAGE);
336
337     std::cout << "HexTile constructed at " << this << " (" << this->address_int
338         << ")" << std::endl;
339
340     return;
341 } /* HexTile() */

```

3.4.2.2 ~HexTile()

```

HexTile::~HexTile (
    void )

```

Destructor for the [HexTile](#) class.

```

717 {
718     std::cout << "HexTile at " << this << " (" << this->address_int
719         << ")" destroyed" << std::endl;
720
721     return;
722 } /* ~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(MONOCHROME_TEXT_RED);
113
114     this->select_outline_sprite.setFill(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.

```
562 {
563     this->resource_assessed = true;
564     this->__setResourceText();
565
566     return;
567 } /* 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.

```
673 {
674     // 1. draw hex
675     this->render_window_ptr->draw(this->tile_sprite);
676
677     // 2. draw node
678     if (this->show_node) {
679         this->render_window_ptr->draw(this->node_sprite);
680     }
681
682     // 3. draw resource
683     if (this->show_resource) {
684         this->render_window_ptr->draw(this->resource_chip_sprite);
685         this->render_window_ptr->draw(this->resource_text);
686     }
687
688     // 4. draw selection outline
689     if (this->is_selected) {
690         sf::Color outline_colour = this->select_outline_sprite.getOutlineColor();
691
692         outline_colour.a =
693             255 * pow(cos((M_PI * this->frame) / (1.5 * FRAMES_PER_SECOND)), 2);
694
695         this->select_outline_sprite.setOutlineColor(outline_colour);
696
697         this->render_window_ptr->draw(this->select_outline_sprite);
698     }
699
700     this->frame++;
701     return;
702 } /* draw() */
```

3.4.3.9 emitSelectedMessage()

```
void HexTile::emitSelectedMessage (
    void )
```

Method to format and emit message when selected.

```
619 {
620     // 1. format message header
621     Message selected_message;
622
623     selected_message.sender_name = "HexTile";
624     selected_message.sender_address = this->address_int;
625     selected_message.subject = "Tile selected";
626     selected_message.channel = MESSAGE_CHANNEL_SELECTED_TILE;
627
628     // 2. format message payload
629
630     //      32 char x 17 line console "-----\n";
631     std::string payload          = "    **** TILE INFO/OPTIONS **** \n";
632     payload                     += " \n";
633     payload                     += " \n";
634     payload                     += " \n";
635     payload                     += " \n";
636     payload                     += " \n";
637     payload                     += " \n";
638     payload                     += " \n";
639     payload                     += " \n";
640     payload                     += " \n";
641     payload                     += " \n";
642     payload                     += " \n";
643     payload                     += " \n";
644     payload                     += " \n";
645     payload                     += " \n";
646     payload                     += " \n";
647     payload                     += "[ESC]: MENU ";
648
649     selected_message.string_payload = payload;
650 }
```

```

651     // 3. send message
652     this->messages_handler_ptr->sendMessage(selected_message);
653
654     std::cout << "HexTile at " << this << " emitted selected message" << std::endl;
655
656     return;
657 } /* emitSelectedMessage() */

```

3.4.3.10 process()

```

void HexTile::process (
    void )

```

Method to process [HexTile](#). To be called once per frame.

```

582 {
583     // 1. handle inputs
584     if (this->inputs_handler_ptr->key_pressed_once_vec[sf::Keyboard::Escape]) {
585         this->is_selected = false;
586     }
587
588     if (inputs_handler_ptr->mouse_left_click) {
589         this->is_selected = false;
590
591         if (this->__isClicked()) {
592             std::cout << "Tile (" << this->position_x << ", " << this->position_y <<
593                 ") was selected" << std::endl;
594
595             this->is_selected = true;
596         }
597     }
598
599     if (inputs_handler_ptr->mouse_right_click) {
600         this->is_selected = false;
601     }
602
603     return;
604 } /* process() */

```

3.4.3.11 setTileResource() [1/2]

```

void HexTile::setTileResource (
    double input_value )

```

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

Parameters

<i>input_value</i>	A numerical input in the closed interval [0, 1].
--------------------	--

```

487 {
488     // 1. check input
489     if (input_value < 0 or input_value > 1) {
490         std::string error_str = "ERROR HexTile::setTileResource() given input value is ";
491         error_str += "not in the closed interval [0, 1]";
492
493         #ifdef _WIN32
494             std::cout << error_str << std::endl;
495         #endif /* _WIN32 */
496
497         throw std::runtime_error(error_str);
498     }
499
500     // 2. convert input value to tile resource
501     TileResource tile_resource;
502

```

```

503     if (input_value <= TILE_RESOURCE_CUMULATIVE_PROBABILITIES[0]) {
504         tile_resource = TileResource :: POOR;
505     }
506     else if (input_value <= TILE_RESOURCE_CUMULATIVE_PROBABILITIES[1]) {
507         tile_resource = TileResource :: BELOW_AVERAGE;
508     }
509     else if (input_value <= TILE_RESOURCE_CUMULATIVE_PROBABILITIES[2]) {
510         tile_resource = TileResource :: AVERAGE;
511     }
512     else if (input_value <= TILE_RESOURCE_CUMULATIVE_PROBABILITIES[3]) {
513         tile_resource = TileResource :: ABOVE_AVERAGE;
514     }
515     else {
516         tile_resource = TileResource :: GOOD;
517     }
518
519     // 3. call alternate method
520     this->setTileResource(tile_resource);
521
522     return;
523 } /* setTileResource(double) */

```

3.4.3.12 setTileResource() [2/2]

```

void HexTile::setTileResource (
    TileResource tile_resource )

```

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

Parameters

<i>tile_resource</i>	The resource (TileResource) value to attribute to the tile.
----------------------	---

```

465 {
466     this->tile_resource = tile_resource;
467     this->__setResourceText();
468
469     return;
470 } /* setTileResource(TileResource) */

```

3.4.3.13 setTileType() [1/2]

```

void HexTile::setTileType (
    double input_value )

```

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

Parameters

<i>input_value</i>	A numerical input in the closed interval [0, 1].
--------------------	--

```

415 {
416     // 1. check input
417     if (input_value < 0 or input_value > 1) {
418         std::string error_str = "ERROR HexTile::setTileType() given input value is ";
419         error_str += "not in the closed interval [0, 1]";
420
421         #ifdef _WIN32
422             std::cout << error_str << std::endl;
423         #endif /* _WIN32 */
424
425         throw std::runtime_error(error_str);

```

```

426     }
427
428     // 2. convert input value to tile type
429     TileType tile_type;
430
431     if (input_value <= TILE_TYPE_CUMULATIVE_PROBABILITIES[0]) {
432         tile_type = TileType :: LAKE;
433     }
434     else if (input_value <= TILE_TYPE_CUMULATIVE_PROBABILITIES[1]) {
435         tile_type = TileType :: PLAINS;
436     }
437     else if (input_value <= TILE_TYPE_CUMULATIVE_PROBABILITIES[2]) {
438         tile_type = TileType :: FOREST;
439     }
440     else {
441         tile_type = TileType :: MOUNTAINS;
442     }
443
444     // 3. call alternate method
445     this->setTileType(tile_type);
446
447     return;
448 } /* setTileType(double) */

```

3.4.3.14 setTileType() [2/2]

```

void HexTile::setTileType (
    TileType tile_type )

```

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

Parameters

<i>tile_type</i>	The type (TileType) to set the tile to.
------------------	---

```

356 {
357     this->tile_type = tile_type;
358
359     switch (this->tile_type) {
360         case (TileType :: FOREST): {
361             this->tile_sprite.setFillColor(FOREST_GREEN);
362
363             break;
364         }
365
366         case (TileType :: LAKE): {
367             this->tile_sprite.setFillColor(LAKE_BLUE);
368
369             break;
370         }
371
372         case (TileType :: MOUNTAINS): {
373             this->tile_sprite.setFillColor(MOUNTAINS_GREY);
374
375             break;
376         }
377
378         case (TileType :: OCEAN): {
379             this->tile_sprite.setFillColor(OCEAN_BLUE);
380
381             break;
382         }
383
384         case (TileType :: PLAINS): {
385             this->tile_sprite.setFillColor(PLAINS_YELLOW);
386
387             break;
388         }
389
390         default: {
391             // do nothing!
392
393             break;
394         }
395     }

```



```
396
397     return;
398 } /* setTileType(TileType) */
```

3.4.3.15 toggleResourceOverlay()

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

Method to toggle the tile resource overlay.

```
538 {
539     if (this->show_resource) {
540         this->show_resource = false;
541     }
542     else {
543         this->show_resource = true;
544     }
545
546     return;
547 } /* toggleResourceOverlay() */
```

3.4.4 Member Data Documentation

3.4.4.1 address_int

```
unsigned long long int HexTile::address_int [private]
```

An int representation of the memory address of this object.

3.4.4.2 address_string

```
std::string HexTile::address_string [private]
```

A string representation of the memory address of this object.

3.4.4.3 assets_manager_ptr

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

A pointer to the assets manager.

3.4.4.4 frame

```
int HexTile::frame
```

The current frame of this object.

3.4.4.5 inputs_handler_ptr

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

A pointer to the inputs handler.

3.4.4.6 is_selected

```
bool HexTile::is_selected
```

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

3.4.4.7 major_radius

```
double HexTile::major_radius
```

The radius of the smallest bounding circle.

3.4.4.8 messages_handler_ptr

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

A pointer to the messages handler.

3.4.4.9 minor_radius

```
double HexTile::minor_radius
```

The radius of the largest inscribed circle.

3.4.4.10 node_sprite

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

A circle shape to mark the tile node.

3.4.4.11 position_x

```
double HexTile::position_x
```

The x position of the tile.

3.4.4.12 position_y

```
double HexTile::position_y
```

The y position of the tile.

3.4.4.13 render_window_ptr

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

A pointer to the render window.

3.4.4.14 resource_assessed

```
bool HexTile::resource_assessed
```

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

3.4.4.15 resource_chip_sprite

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

A circle shape which represents a resource chip.

3.4.4.16 resource_text

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

A text representation of the resource.

3.4.4.17 select_outline_sprite

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

A convex shape which outlines the tile when selected.

3.4.4.18 show_node

```
bool HexTile::show_node
```

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

3.4.4.19 show_resource

```
bool HexTile::show_resource
```

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

3.4.4.20 tile_resource

```
TileResource HexTile::tile_resource
```

3.4.4.21 tile_sprite

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

A convex shape which represents the tile.

3.4.4.22 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 InputHandler Class Reference

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

```
#include <InputHandler.h>
```

Public Member Functions

- [InputHandler](#) (void)
Constructor for the [InputHandler](#) class.
- void [process](#) (sf::Event *)
- void [printKeysPressed](#) (void)
Method to print out which keys are currently pressed.
- void [reset](#) (void)
Method to reset [InputHandler](#). To be called once per frame (at end of frame!).
- [~InputHandler](#) (void)
Destructor for the [InputHandler](#) 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 Message Struct Reference

A structure which defines a standard message format.

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

Public Attributes

- std::string [sender_name](#) = ""
A string representation of the sender's class.
- unsigned long long int [sender_address](#) = 0
- std::string [subject](#) = ""
An int representation of the sender's memory address.
- std::string [channel](#) = ""
A string identifying the appropriate channel for this message.
- std::vector< bool > [bool_payload_vec](#) = {}
A vector <bool> payload.
- std::vector< int > [int_payload_vec](#) = {}
A vector <int> payload.
- std::vector< double > [double_payload_vec](#) = {}
A vector <double> payload.
- std::string [string_payload](#) = ""
A string payload.

3.6.1 Detailed Description

A structure which defines a standard message format.

3.6.2 Member Data Documentation

3.6.2.1 bool_payload_vec

```
std::vector<bool> Message::bool_payload_vec = {}
```

A vector <bool> payload.

3.6.2.2 channel

```
std::string Message::channel = ""
```

A string identifying the appropriate channel for this message.

3.6.2.3 double_payload_vec

```
std::vector<double> Message::double_payload_vec = {}
```

A vector <double> payload.

3.6.2.4 int_payload_vec

```
std::vector<int> Message::int_payload_vec = {}
```

A vector <int> payload.

3.6.2.5 sender_address

```
unsigned long long int Message::sender_address = 0
```

3.6.2.6 sender_name

```
std::string Message::sender_name = ""
```

A string representation of the sender's class.

3.6.2.7 string_payload

```
std::string Message::string_payload = ""
```

A string payload.

3.6.2.8 subject

```
std::string Message::subject = ""
```

An int representation of the sender's memory address.

A string describing the message subject.

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

- header/ESC_core/[MessagesHandler.h](#)

3.7 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 [addChannel](#) (std::string)
Method to add channel to message map.
- void [removeChannel](#) (std::string)
Method to remove channel from message map.
- void [sendMessage](#) ([Message](#))
Method to send a message to the message map.
- bool [isEmpty](#) (std::string)
Method to check if channel is empty.
- [Message](#) [receiveMessage](#) (std::string)
Method to receive the latest message in the given channel.
- void [process](#) (void)
Method to process messages. To be called once per frame.
- void [clear](#) (void)
Method to clear the [MessagesHandler](#).
- [~MessagesHandler](#) (void)
Destructor for the [MessagesHandler](#) class.

Private Attributes

- `std::map< std::string, std::list< Message > > message_map`

A map <string, list of [Message](#)> for sending and receiving messages. Here the key is the channel, and each channel maintains a list (history) of messages.

3.7.1 Detailed Description

A class which handles message traffic between game objects.

3.7.2 Constructor & Destructor Documentation

3.7.2.1 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() */
```

3.7.2.2 ~MessagesHandler()

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

Destructor for the [MessagesHandler](#) class.

```
310 {
311     this->clear();
312
313     std::cout << "MessagesHandler at " << this << " destroyed" << std::endl;
314
315     return;
316 } /* ~MessagesHandler() */
```

3.7.3 Member Function Documentation

3.7.3.1 addChannel()

```
void MessagesHandler::addChannel (
    std::string channel )
```

Method to add channel to message map.

Parameters

<i>channel</i>	The key for the message channel being added.
----------------	--

```

69 {
70     // 1. check if channel is in map (if so, throw error)
71     if (this->message_map.count(channel) > 0) {
72         std::string error_str = "ERROR MessagesHandler::addChannel() channel ";
73         error_str += channel;
74         error_str += " is already in message map";
75
76         #ifdef _WIN32
77             std::cout << error_str << std::endl;
78         #endif /* _WIN32 */
79
80         throw std::runtime_error(error_str);
81     }
82
83     // 2. add channel to map
84     this->message_map[channel] = {};
85
86     return;
87 } /* addChannel() */

```

3.7.3.2 clear()

```

void MessagesHandler::clear (
    void )

```

Method to clear the [MessagesHandler](#).

```

283 {
284
285     std::map<std::string, std::list<Message>::iterator map_iter;
286     for (
287         map_iter = this->message_map.begin();
288         map_iter != this->message_map.end();
289         map_iter++
290     ) {
291         map_iter->second.clear();
292     }
293     this->message_map.clear();
294
295     return;
296 } /* clear() */

```

3.7.3.3 isEmpty()

```

bool MessagesHandler::isEmpty (
    std::string channel )

```

Method to check if channel is empty.

Parameters

<i>channel</i>	The key for the message channel being checked.
----------------	--

Returns

A boolean indicating whether the channel is empty or not.

```

179 {
180     // 1. check if channel is in map (if not, throw error)
181     if (this->message_map.count(channel) <= 0) {
182         std::string error_str = "ERROR MessagesHandler::isEmpty() channel ";
183         error_str += channel;
184         error_str += " is not in message map";
185
186         #ifdef _WIN32
187             std::cout << error_str << std::endl;
188         #endif /* _WIN32 */
189
190         throw std::runtime_error(error_str);
191     }
192
193     if (this->message_map[channel].empty()) {
194         return true;
195     }
196     else {
197         return false;
198     }
199 } /* isEmpty() */

```

3.7.3.4 process()

```

void MessagesHandler::process (
    void )

```

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

```

264 {
265     //...
266
267     return;
268 } /* process() */

```

3.7.3.5 receiveMessage()

```

Message MessagesHandler::receiveMessage (
    std::string channel )

```

Method to receive the latest message in the given channel.

Parameters

<i>channel</i>	The key for the message channel being received from.
----------------	--

Returns

The latest message in the given channel.

```

218 {
219     // 1. check if channel is in map (if not, throw error)
220     if (this->message_map.count(channel) <= 0) {
221         std::string error_str = "ERROR MessagesHandler::receiveMessage() channel ";
222         error_str += channel;
223         error_str += " is not in message map";
224
225         #ifdef _WIN32
226             std::cout << error_str << std::endl;
227         #endif /* _WIN32 */
228
229         throw std::runtime_error(error_str);
230     }

```

```

231
232 // 2. check if channel is empty (if so, throw error)
233 if (this->message_map[channel].empty()) {
234     std::string error_str = "ERROR MessagesHandler::receiveMessage() channel ";
235     error_str += channel;
236     error_str += " is empty";
237
238     #ifdef _WIN32
239         std::cout << error_str << std::endl;
240     #endif /* _WIN32 */
241
242     throw std::runtime_error(error_str);
243 }
244
245 // 3. receive message
246 Message message = this->message_map[channel].back();
247
248 return message;
249 } /* receiveMessage() */

```

3.7.3.6 removeChannel()

```

void MessagesHandler::removeChannel (
    std::string channel )

```

Method to remove channel from message map.

Parameters

<i>channel</i>	The key for the message channel being removed.
----------------	--

```

104 {
105 // 1. check if channel is in map (if not, throw error)
106 if (this->message_map.count(channel) <= 0) {
107     std::string error_str = "ERROR MessagesHandler::removeChannel() channel ";
108     error_str += channel;
109     error_str += " is not in message map";
110
111     #ifdef _WIN32
112         std::cout << error_str << std::endl;
113     #endif /* _WIN32 */
114
115     throw std::runtime_error(error_str);
116 }
117
118 // 2. remove channel from map
119 this->message_map[channel].clear();
120 this->message_map.erase(channel);
121
122 return;
123 } /* removeChannel() */

```

3.7.3.7 sendMessage()

```

void MessagesHandler::sendMessage (
    Message message )

```

Method to send a message to the message map.

Parameters

<i>message</i>	The message to be sent.
----------------	-------------------------

```
140 {
141     // 1. check if channel is in map (if not, throw error)
142     std::string channel = message.channel;
143
144     if (this->message_map.count(channel) <= 0) {
145         std::string error_str = "ERROR MessagesHandler::sendMessage() channel ";
146         error_str += channel;
147         error_str += " is not in message map";
148
149         #ifdef _WIN32
150             std::cout << error_str << std::endl;
151         #endif /* _WIN32 */
152
153         throw std::runtime_error(error_str);
154     }
155
156     // 2. send message to message map
157     this->message_map[channel].push_back(message);
158
159     return;
160 } /* sendMessage() */
```

3.7.4 Member Data Documentation

3.7.4.1 message_map

```
std::map<std::string, std::list<Message> > MessagesHandler::message_map [private]
```

A map <string, list of [Message](#)> for sending and receiving messages. Here the key is the channel, and each channel maintains a list (history) of messages.

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

- header/ESC_core/[MessagesHandler.h](#)
- source/ESC_core/[MessagesHandler.cpp](#)

Chapter 4

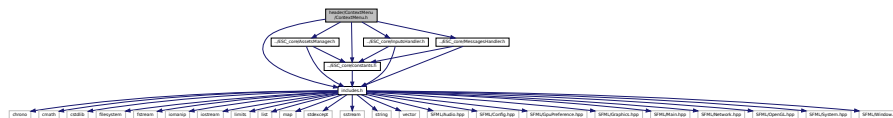
File Documentation

4.1 header/ContextMenu/ContextMenu.h File Reference

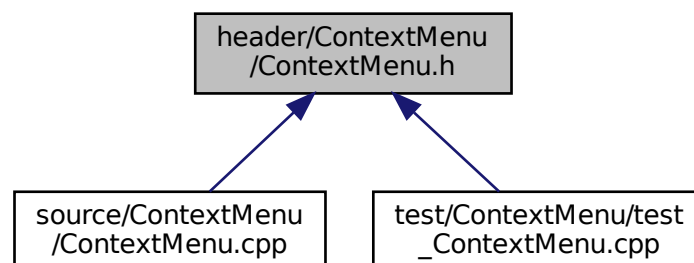
Header file for the [ContextMenu](#) class.

```
#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.

Enumerations

- enum [ConsoleState](#) {
[NONE](#) , [READY](#) , [MENU](#) , [TILE](#) ,
[N_CONSOLE_STATES](#) }

An enumeration of the different console screen states.

4.1.1 Detailed Description

Header file for the [ContextMenu](#) class.

4.1.2 Enumeration Type Documentation

4.1.2.1 ConsoleState

enum [ConsoleState](#)

An enumeration of the different console screen states.

Enumerator

NONE	None state (for initialization)
READY	Ready (default) state.
MENU	Game menu state.
TILE	Tile context state.
N_CONSOLE_STATES	A simple hack to get the number of console screen states.

```

35         {
36     NONE,
37     READY,
38     MENU,
39     TILE,
40     N_CONSOLE_STATES
41 };

```

4.2 header/ESC_core/AssetsManager.h File Reference

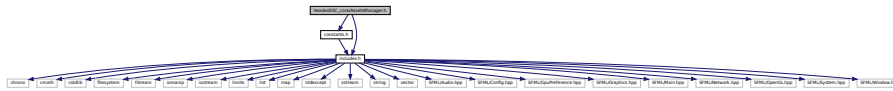
Header file for the [AssetsManager](#) class.

```

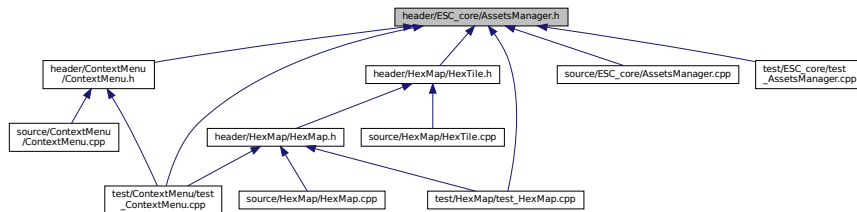
#include "constants.h"
#include "includes.h"

```

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

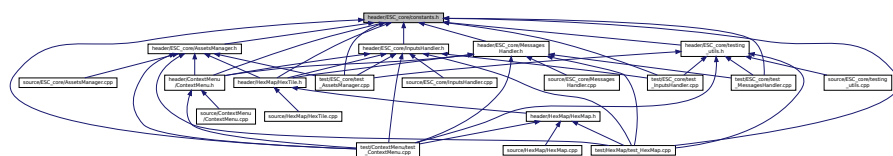
Header file for various constants.

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

Include dependency graph for constants.h:



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



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.
- `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).
- `const sf::Color MONOCHROME_TEXT_AMBER` (255, 176, 0)
The base colour of old monochrome text (amber).
- `const sf::Color MONOCHROME_TEXT_RED` (255, 44, 0)
The base colour of old monochrome text (red).

Variables

- `const double FLOAT_TOLERANCE` = 1e-6
Tolerance for floating point equality tests.
- `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.
- `const std::vector< double > TILE_TYPE_CUMULATIVE_PROBABILITIES`
Cumulative probabilities for each tile type (to support procedural generation).
- `const std::vector< double > TILE_RESOURCE_CUMULATIVE_PROBABILITIES`
Cumulative probabilities for each tile resource (to support procedural generation).
- `const std::string MESSAGE_CHANNEL_SELECTED_TILE` = "MESSAGE_CHANNEL_SELECTED_TILE"
A channel for tile selection messages (for indexing into message map).

4.3.1 Detailed Description

Header file for various constants.

4.3.2 Function Documentation

4.3.2.1 FOREST_GREEN()

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

The base colour of a forest tile.

4.3.2.2 LAKE_BLUE()

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

The base colour of a lake (water) tile.

4.3.2.3 MENU_FRAME_GREY()

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

The base colour of the context menu frame.

4.3.2.4 MONOCHROME_SCREEN_BACKGROUND()

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

The base colour of old monochrome screens.

4.3.2.5 MONOCHROME_TEXT_AMBER()

```
const sf::Color MONOCHROME_TEXT_AMBER (
    255 ,
    176 ,
    0 )
```

The base colour of old monochrome text (amber).

4.3.2.6 MONOCHROME_TEXT_GREEN()

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

The base colour of old monochrome text (green).

4.3.2.7 MONOCHROME_TEXT_RED()

```
const sf::Color MONOCHROME_TEXT_RED (
    255 ,
    44 ,
    0 )
```

The base colour of old monochrome text (red).

4.3.2.8 MOUNTAINS_GREY()

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

The base colour of a mountains tile.

4.3.2.9 OCEAN_BLUE()

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

The base colour of an ocean (water) tile.

4.3.2.10 PLAINS_YELLOW()

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

The base colour of a plains tile.

4.3.2.11 VISUAL_SCREEN_FRAME_GREY()

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

The base colour of the framing of the visual screen.

4.3.3 Variable Documentation

4.3.3.1 FLOAT_TOLERANCE

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

Tolerance for floating point equality tests.

4.3.3.2 FRAMES_PER_SECOND

```
const int FRAMES_PER_SECOND = 60
```

Target frames per second.

4.3.3.3 GAME_HEIGHT

```
const int GAME_HEIGHT = 800
```

Height of the game space.

4.3.3.4 GAME_WIDTH

```
const int GAME_WIDTH = 1200
```

Width of the game space.

4.3.3.5 MESSAGE_CHANNEL_SELECTED_TILE

```
const std::string MESSAGE_CHANNEL_SELECTED_TILE = "MESSAGE_CHANNEL_SELECTED_TILE"
```

A channel for tile selection messages (for indexing into message map).

4.3.3.6 SECONDS_PER_FRAME

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

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

4.3.3.7 TILE_RESOURCE_CUMULATIVE_PROBABILITIES

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

Initial value:

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

Cumulative probabilities for each tile resource (to support procedural generation).

4.3.3.8 TILE_TYPE_CUMULATIVE_PROBABILITIES

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

Initial value:

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

Cumulative probabilities for each tile type (to support procedural generation).

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

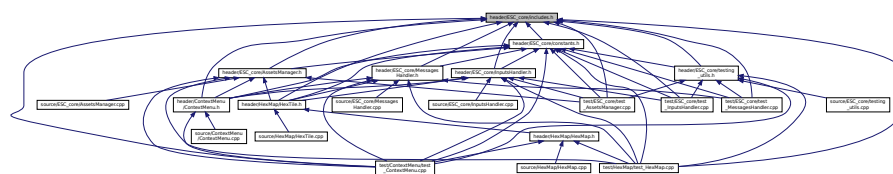
Header file for various includes.

```
#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:



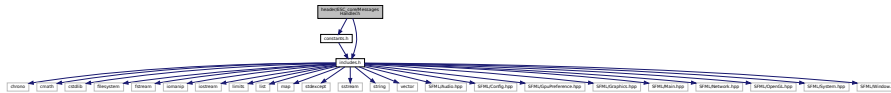
This graph shows which files directly or indirectly include this file:



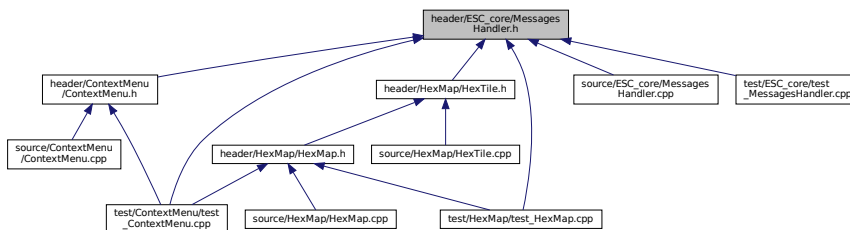
4.7 header/ESC_core/MessagesHandler.h File Reference

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

- struct **Message**
A structure which defines a standard message format.
- class **MessagesHandler**
A class which handles message traffic between game objects.

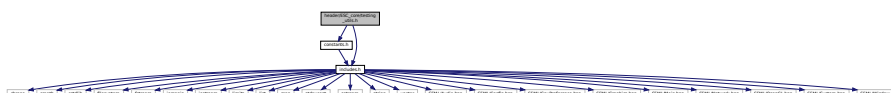
4.7.1 Detailed Description

Header file for the `MessagesHandler` class.

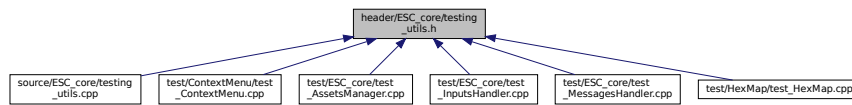
4.8 header/ESC_core/testing_utils.h File Reference

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 $x \geq y$.
- void `testLessThan` (double, double, std::string, int)
Tests if $x < y$.
- void `testLessThanOrEqualTo` (double, double, std::string, int)
Tests if $x \leq y$.
- 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.

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

<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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

<i>input_str</i>	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

<i>input_str</i>	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

<i>input_str</i>	The text of the string to be sent to <code>std::cout</code> .
------------------	---

```
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

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in " <code>__FILE__</code> ").
<i>line</i>	The line of the file in which the test is applied (you should be able to just pass in " <code>__LINE__</code> ").

```
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

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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 $x \geq y$.

Parameters

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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 $x \leq y$.

Parameters

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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

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

```

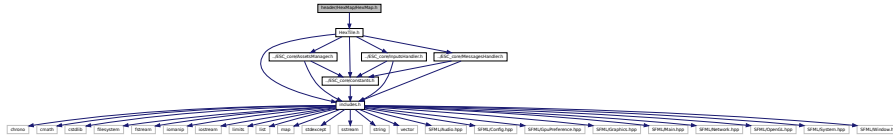
390 {
391     if (statement) {
392         return;
393     }
394
395     std::string error_str = "ERROR: testTruth():\t in ";
396     error_str += file;
397     error_str += "\tline ";
398     error_str += std::to_string(line);
399     error_str += ":\t\n";
400     error_str += "Given statement is not 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() */

```

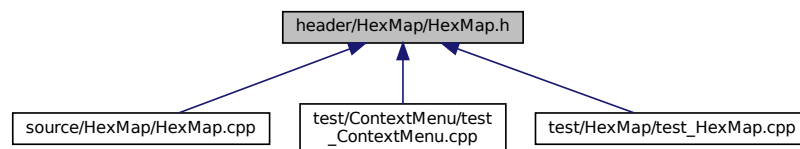
4.9 header/HexMap/HexMap.h File Reference

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.

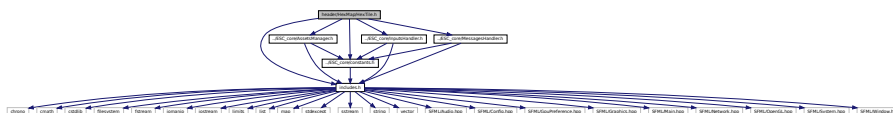
4.9.1 Detailed Description

Header file for the [HexMap](#) class.

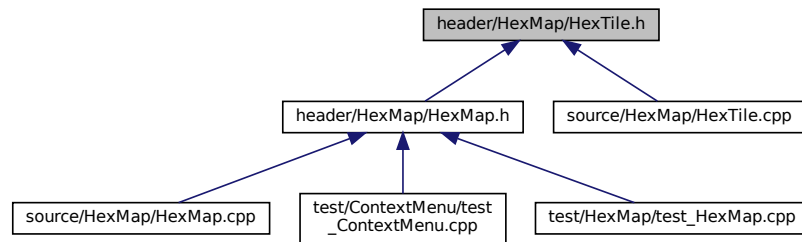
4.10 header/HexMap/HexTile.h File Reference

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.

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

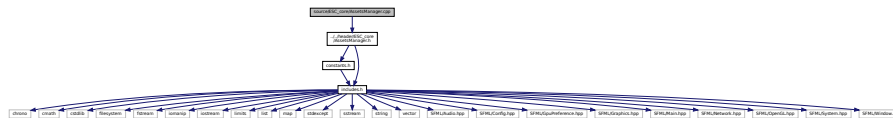
POOR	A poor resource value.
BELOW_AVERAGE	A below average resource value.
AVERAGE	An average resource value.
ABOVE_AVERAGE	An above average resource value.
GOOD	A good resource value.
N_TILE_RESOURCES	A simple hack to get the number of elements in TileResource.

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.

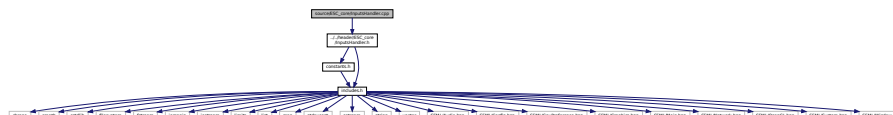
A class which manages visual and sound assets.

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 <vector>, <iostream>, <string>, <memory>, <algorithm>, <functional>
Include dependency graph for MessagesHandler.cpp:
```



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

<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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

<i>input_str</i>	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

<i>input_str</i>	The text of the string to be sent to <code>std::cout</code> .
------------------	---

```

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

<i>input_str</i>	The text of the string to be sent to <code>std::cout</code> .
------------------	---

```

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

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in " <code>__FILE__</code> ").
<i>line</i>	The line of the file in which the test is applied (you should be able to just pass in " <code>__LINE__</code> ").

```

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

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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 $x \geq y$.

Parameters

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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 $x \leq y$.

Parameters

<i>x</i>	The first of two numbers to test.
<i>y</i>	The second of two numbers to test.
<i>file</i>	The file in which the test is applied (you should be able to just pass in "__FILE__").
<i>line</i>	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

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

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         messages_handler.process();
123
124         hex_map.process();
125         context_menu.process();
126
127         if (inputs_handler.key_pressed_once_vec[sf::Keyboard::Q]) {
128             std::cout << "Q" << std::endl;
129             hex_map.reroll();
130         }
131
132         if (inputs_handler.key_pressed_once_vec[sf::Keyboard::R]) {
133             std::cout << "R" << std::endl;
134             hex_map.toggleResourceOverlay();
135         }
136
137         if (inputs_handler.key_pressed_once_vec[sf::Keyboard::A]) {
138             std::cout << "A" << std::endl;
139             hex_map.assess();
140         }
141
142         window.clear();
143
144         hex_map.draw(); // draw hex map before context menu!
145         context_menu.draw();
146
147         window.display();
148
149         inputs_handler.reset();
150
151         std::cout << frame << " : " << time_since_run_s << "\r" << std::flush;
152         frame++;
153     }
154 }
155 }
156
157
158 catch (...) {
159     //...
160
161     printGold(" ");
162     for (int i = 0; i < n_dots; i++) {
163         printGold(".");
164     }
165     printGold(" ");
166     printRed("FAIL");
167     std::cout << std::endl;
168     throw;
169 }
170
171 //...
172
173 printGold(" ");
174 for (int i = 0; i < n_dots; i++) {
175     printGold(".");
176 }
177 printGold(" ");
178 printGreen("PASS");
179 std::cout << std::endl;
180
181 return 0;
182 }
183 /* 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"

```



```

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"

```



```

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

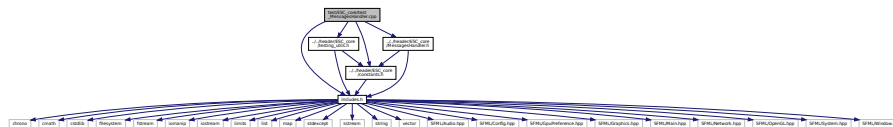
Suite of tests for the [MessagesHandler](#) class.

```

#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() */

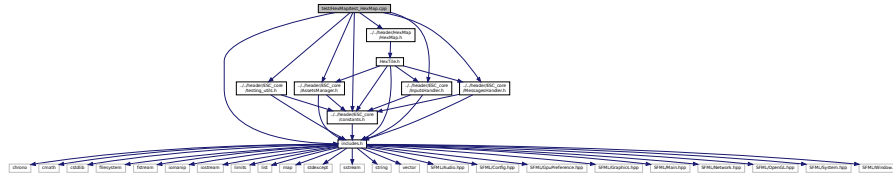
```

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 )
{
    #ifdef _WIN32
        activateVirtualTerminal();
    #endif /* _WIN32 */

    printGold("\tTesting HexMap");
    std::cout << std::endl;

    srand(time(NULL));
    int n_dots = 8;

    try {
        // 1. construct, load/open some test assets
        AssetsManager assets_manager;
        InputsHandler inputs_handler;
        MessagesHandler messages_handler;

        assets_manager.loadFont("assets/fonts/DroidSansMono.ttf", "DroidSansMono");

        // 2. test game loop
        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/>. 92

D. van Heesch. Doxygen: Generate documentation from source code, 2023. URL <https://www.doxygen.nl>. 91

Wikipedia. Hexagon, 2023. URL <https://en.wikipedia.org/wiki/Hexagon>. 54

Index

- __assembleHexMap
 - HexMap, [36](#)
- __constructKeyCodeMap
 - InputsHandler, [68](#)
- __drawConsoleScreenFrame
 - ContextMenu, [20](#)
- __drawConsoleText
 - ContextMenu, [20](#)
- __drawVisualScreenFrame
 - ContextMenu, [21](#)
- __enforceOceanContinuity
 - HexMap, [36](#)
- __getMajorityTileType
 - HexMap, [37](#)
- __getNeighboursVector
 - HexMap, [38](#)
- __getNoise
 - HexMap, [38](#)
- __getSelectedTile
 - HexMap, [40](#)
- __getValidMapIndexPositions
 - HexMap, [40](#)
- __isClicked
 - HexTile, [55](#)
- __isLakeTouchingOcean
 - HexMap, [41](#)
- __layTiles
 - HexMap, [42](#)
- __loadSoundBuffer
 - AssetsManager, [7](#)
- __procedurallyGenerateTileResources
 - HexMap, [44](#)
- __procedurallyGenerateTileTypes
 - HexMap, [44](#)
- __sendDummySelectedMessage
 - HexMap, [45](#)
- __setConsoleState
 - ContextMenu, [21](#)
- __setConsoleString
 - ContextMenu, [22](#)
- __setResourceText
 - HexTile, [56](#)
- __setUpConsoleScreen
 - ContextMenu, [23](#)
- __setUpConsoleScreenFrame
 - ContextMenu, [23](#)
- __setUpGlassScreen
 - HexMap, [45](#)
- __setUpMenuFrame
 - ContextMenu, [25](#)
- __setUpNodeSprite
 - HexTile, [57](#)
- __setUpResourceChipSprite
 - HexTile, [57](#)
- __setUpSelectOutlineSprite
 - HexTile, [57](#)
- __setUpTileSprite
 - HexTile, [58](#)
- __setUpVisualScreen
 - ContextMenu, [25](#)
- __setUpVisualScreenFrame
 - ContextMenu, [25](#)
- __smoothTileTypes
 - HexMap, [46](#)
- ~AssetsManager
 - AssetsManager, [6](#)
- ~ContextMenu
 - ContextMenu, [20](#)
- ~HexMap
 - HexMap, [35](#)
- ~HexTile
 - HexTile, [55](#)
- ~InputsHandler
 - InputsHandler, [68](#)
- ~MessagesHandler
 - MessagesHandler, [78](#)
- ABOVE_AVERAGE
 - HexTile.h, [101](#)
- addChannel
 - MessagesHandler, [78](#)
- address_int
 - ContextMenu, [28](#)
 - HexMap, [49](#)
 - HexTile, [63](#)
- address_string
 - ContextMenu, [28](#)
 - HexMap, [49](#)
 - HexTile, [63](#)
- assess
 - HexMap, [46](#)
 - HexTile, [58](#)
- assets_manager_ptr
 - ContextMenu, [29](#)
 - HexMap, [49](#)
 - HexTile, [63](#)
- AssetsManager, [5](#)
 - __loadSoundBuffer, [7](#)
 - ~AssetsManager, [6](#)

- AssetsManager, 6
- clear, 8
- current_track, 16
- font_map, 16
- getCurrentTrackKey, 9
- getFont, 9
- getSound, 10
- getSoundBuffer, 10
- getTexture, 11
- getTrackStatus, 11
- loadFont, 12
- loadSound, 12
- loadTexture, 13
- loadTrack, 14
- nextTrack, 14
- pauseTrack, 15
- playTrack, 15
- previousTrack, 15
- sound_map, 16
- soundbuffer_map, 16
- stopTrack, 15
- texture_map, 16
- track_map, 17
- AVERAGE
 - HexTile.h, 101
- BELOW_AVERAGE
 - HexTile.h, 101
- bool_payload_vec
 - Message, 75
- border_tiles_vec
 - HexMap, 49
- channel
 - Message, 76
- clear
 - AssetsManager, 8
 - HexMap, 46
 - MessagesHandler, 79
- console_screen
 - ContextMenu, 29
- console_screen_frame_bottom
 - ContextMenu, 29
- console_screen_frame_left
 - ContextMenu, 29
- console_screen_frame_right
 - ContextMenu, 29
- console_screen_frame_top
 - ContextMenu, 29
- console_state
 - ContextMenu, 30
- console_string
 - ContextMenu, 30
- ConsoleState
 - ContextMenu.h, 84
- constants.h
 - FLOAT_TOLERANCE, 89
 - FOREST_GREEN, 87
 - FRAMES_PER_SECOND, 89
 - GAME_HEIGHT, 89
 - GAME_WIDTH, 89
 - LAKE_BLUE, 87
 - MENU_FRAME_GREY, 87
 - MESSAGE_CHANNEL_SELECTED_TILE, 90
 - MONOCHROME_SCREEN_BACKGROUND, 87
 - MONOCHROME_TEXT_AMBER, 87
 - MONOCHROME_TEXT_GREEN, 88
 - MONOCHROME_TEXT_RED, 88
 - MOUNTAINS_GREY, 88
 - OCEAN_BLUE, 88
 - PLAINS_YELLOW, 88
 - SECONDS_PER_FRAME, 90
 - TILE_RESOURCE_CUMULATIVE_PROBABILITIES, 90
 - TILE_TYPE_CUMULATIVE_PROBABILITIES, 90
 - VISUAL_SCREEN_FRAME_GREY, 89
- ContextMenu, 17
 - __drawConsoleScreenFrame, 20
 - __drawConsoleText, 20
 - __drawVisualScreenFrame, 21
 - __setConsoleState, 21
 - __setConsoleString, 22
 - __setUpConsoleScreen, 23
 - __setUpConsoleScreenFrame, 23
 - __setUpMenuFrame, 25
 - __setUpVisualScreen, 25
 - __setUpVisualScreenFrame, 25
 - ~ContextMenu, 20
 - address_int, 28
 - address_string, 28
 - assets_manager_ptr, 29
 - console_screen, 29
 - console_screen_frame_bottom, 29
 - console_screen_frame_left, 29
 - console_screen_frame_right, 29
 - console_screen_frame_top, 29
 - console_state, 30
 - console_string, 30
 - ContextMenu, 19
 - draw, 27
 - frame, 30
 - game_menu_up, 30
 - inputs_handler_ptr, 30
 - menu_frame, 30
 - messages_handler_ptr, 31
 - position_x, 31
 - position_y, 31
 - process, 27
 - render_window_ptr, 31
 - visual_screen, 31
 - visual_screen_frame_bottom, 31
 - visual_screen_frame_left, 32
 - visual_screen_frame_right, 32
 - visual_screen_frame_top, 32
- ContextMenu.h
 - ConsoleState, 84
 - MENU, 84

- N_CONSOLE_STATES, [84](#)
- NONE, [84](#)
- READY, [84](#)
- TILE, [84](#)
- current_track
 - AssetsManager, [16](#)
- double_payload_vec
 - Message, [76](#)
- draw
 - ContextMenu, [27](#)
 - HexMap, [47](#)
 - HexTile, [58](#)
- emitSelectedMessage
 - HexTile, [59](#)
- expectedErrorNotDetected
 - testing_utils.cpp, [105](#)
 - testing_utils.h, [94](#)
- FLOAT_TOLERANCE
 - constants.h, [89](#)
- font_map
 - AssetsManager, [16](#)
- FOREST
 - HexTile.h, [102](#)
- FOREST_GREEN
 - constants.h, [87](#)
- frame
 - ContextMenu, [30](#)
 - HexMap, [49](#)
 - HexTile, [63](#)
- FRAMES_PER_SECOND
 - constants.h, [89](#)
- GAME_HEIGHT
 - constants.h, [89](#)
- game_menu_up
 - ContextMenu, [30](#)
- GAME_WIDTH
 - constants.h, [89](#)
- getCurrentTrackKey
 - AssetsManager, [9](#)
- getFont
 - AssetsManager, [9](#)
- getSound
 - AssetsManager, [10](#)
- getSoundBuffer
 - AssetsManager, [10](#)
- getTexture
 - AssetsManager, [11](#)
- getTrackStatus
 - AssetsManager, [11](#)
- glass_screen
 - HexMap, [50](#)
- GOOD
 - HexTile.h, [101](#)
- header/ContextMenu/ContextMenu.h, [83](#)
- header/ESC_core/AssetsManager.h, [84](#)
- header/ESC_core/constants.h, [85](#)
- header/ESC_core/doxygen_cite.h, [91](#)
- header/ESC_core/includes.h, [91](#)
- header/ESC_core/InputsHandler.h, [92](#)
- header/ESC_core/MessagesHandler.h, [93](#)
- header/ESC_core/testing_utils.h, [93](#)
- header/HexMap/HexMap.h, [100](#)
- header/HexMap/HexTile.h, [100](#)
- hex_map
 - HexMap, [50](#)
- HexMap, [32](#)
 - __assembleHexMap, [36](#)
 - __enforceOceanContinuity, [36](#)
 - __getMajorityTileType, [37](#)
 - __getNeighboursVector, [38](#)
 - __getNoise, [38](#)
 - __getSelectedTile, [40](#)
 - __getValidMapIndexPositions, [40](#)
 - __isLakeTouchingOcean, [41](#)
 - __layTiles, [42](#)
 - __procedurallyGenerateTileResources, [44](#)
 - __procedurallyGenerateTileTypes, [44](#)
 - __sendDummySelectedMessage, [45](#)
 - __setUpGlassScreen, [45](#)
 - __smoothTileTypes, [46](#)
- ~HexMap, [35](#)
- address_int, [49](#)
- address_string, [49](#)
- assess, [46](#)
- assets_manager_ptr, [49](#)
- border_tiles_vec, [49](#)
- clear, [46](#)
- draw, [47](#)
- frame, [49](#)
- glass_screen, [50](#)
- hex_map, [50](#)
- HexMap, [35](#)
- inputs_handler_ptr, [50](#)
- messages_handler_ptr, [50](#)
- n_layers, [50](#)
- n_tiles, [50](#)
- position_x, [51](#)
- position_y, [51](#)
- process, [47](#)
- render_window_ptr, [51](#)
- reroll, [48](#)
- tile_position_x_vec, [51](#)
- tile_position_y_vec, [51](#)
- toggleResourceOverlay, [48](#)
- HexTile, [52](#)
 - __isClicked, [55](#)
 - __setResourceText, [56](#)
 - __setUpNodeSprite, [57](#)
 - __setUpResourceChipSprite, [57](#)
 - __setUpSelectOutlineSprite, [57](#)
 - __setUpTileSprite, [58](#)
- ~HexTile, [55](#)

- address_int, 63
- address_string, 63
- assess, 58
- assets_manager_ptr, 63
- draw, 58
- emitSelectedMessage, 59
- frame, 63
- HexTile, 54
- inputs_handler_ptr, 64
- is_selected, 64
- major_radius, 64
- messages_handler_ptr, 64
- minor_radius, 64
- node_sprite, 64
- position_x, 65
- position_y, 65
- process, 60
- render_window_ptr, 65
- resource_assessed, 65
- resource_chip_sprite, 65
- resource_text, 65
- select_outline_sprite, 66
- setTileResource, 60, 61
- setTileType, 61, 62
- show_node, 66
- show_resource, 66
- tile_resource, 66
- tile_sprite, 66
- tile_type, 66
- toggleResourceOverlay, 63
- HexTile.h
 - ABOVE_AVERAGE, 101
 - AVERAGE, 101
 - BELOW_AVERAGE, 101
 - FOREST, 102
 - GOOD, 101
 - LAKE, 102
 - MOUNTAINS, 102
 - N_TILE_RESOURCES, 101
 - N_TILE_TYPES, 102
 - OCEAN, 102
 - PLAINS, 102
 - POOR, 101
 - TileResource, 101
 - TileType, 102
- inputs_handler_ptr
 - ContextMenu, 30
 - HexMap, 50
 - HexTile, 64
- InputsHandler, 67
 - __constructKeyCodeMap, 68
 - ~InputsHandler, 68
 - InputsHandler, 68
 - key_code_map, 74
 - key_press_vec, 74
 - key_pressed_once_vec, 74
 - mouse_left_click, 74
 - mouse_right_click, 74
 - printKeysPressed, 72
 - process, 73
 - reset, 73
- int_payload_vec
 - Message, 76
- is_selected
 - HexTile, 64
- isEmpty
 - MessagesHandler, 79
- key_code_map
 - InputsHandler, 74
- key_press_vec
 - InputsHandler, 74
- key_pressed_once_vec
 - InputsHandler, 74
- LAKE
 - HexTile.h, 102
- LAKE_BLUE
 - constants.h, 87
- loadFont
 - AssetsManager, 12
- loadSound
 - AssetsManager, 12
- loadTexture
 - AssetsManager, 13
- loadTrack
 - AssetsManager, 14
- main
 - test_AssetsManager.cpp, 114
 - test_ContextMenu.cpp, 111
 - test_HexMap.cpp, 121
 - test_InputsHandler.cpp, 117
 - test_MessagesHandler.cpp, 119
- major_radius
 - HexTile, 64
- MENU
 - ContextMenu.h, 84
- menu_frame
 - ContextMenu, 30
- MENU_FRAME_GREY
 - constants.h, 87
- Message, 75
 - bool_payload_vec, 75
 - channel, 76
 - double_payload_vec, 76
 - int_payload_vec, 76
 - sender_address, 76
 - sender_name, 76
 - string_payload, 76
 - subject, 77
- MESSAGE_CHANNEL_SELECTED_TILE
 - constants.h, 90
- message_map
 - MessagesHandler, 82
- messages_handler_ptr
 - ContextMenu, 31

- HexMap, 50
- HexTile, 64
- MessagesHandler, 77
 - ~MessagesHandler, 78
 - addChannel, 78
 - clear, 79
 - isEmpty, 79
 - message_map, 82
 - MessagesHandler, 78
 - process, 80
 - receiveMessage, 80
 - removeChannel, 81
 - sendMessage, 81
- minor_radius
 - HexTile, 64
- MONOCHROME_SCREEN_BACKGROUND
 - constants.h, 87
- MONOCHROME_TEXT_AMBER
 - constants.h, 87
- MONOCHROME_TEXT_GREEN
 - constants.h, 88
- MONOCHROME_TEXT_RED
 - constants.h, 88
- MOUNTAINS
 - HexTile.h, 102
- MOUNTAINS_GREY
 - constants.h, 88
- mouse_left_click
 - InputsHandler, 74
- mouse_right_click
 - InputsHandler, 74
- N_CONSOLE_STATES
 - ContextMenu.h, 84
- n_layers
 - HexMap, 50
- N_TILE_RESOURCES
 - HexTile.h, 101
- N_TILE_TYPES
 - HexTile.h, 102
- n_tiles
 - HexMap, 50
- nextTrack
 - AssetsManager, 14
- node_sprite
 - HexTile, 64
- NONE
 - ContextMenu.h, 84
- OCEAN
 - HexTile.h, 102
- OCEAN_BLUE
 - constants.h, 88
- pauseTrack
 - AssetsManager, 15
- PLAINS
 - HexTile.h, 102
- PLAINS_YELLOW
 - constants.h, 88
- playTrack
 - AssetsManager, 15
- POOR
 - HexTile.h, 101
- position_x
 - ContextMenu, 31
 - HexMap, 51
 - HexTile, 65
- position_y
 - ContextMenu, 31
 - HexMap, 51
 - HexTile, 65
- previousTrack
 - AssetsManager, 15
- printGold
 - testing_utils.cpp, 105
 - testing_utils.h, 95
- printGreen
 - testing_utils.cpp, 105
 - testing_utils.h, 95
- printKeysPressed
 - InputsHandler, 72
- printRed
 - testing_utils.cpp, 106
 - testing_utils.h, 95
- process
 - ContextMenu, 27
 - HexMap, 47
 - HexTile, 60
 - InputsHandler, 73
 - MessagesHandler, 80
- READY
 - ContextMenu.h, 84
- receiveMessage
 - MessagesHandler, 80
- removeChannel
 - MessagesHandler, 81
- render_window_ptr
 - ContextMenu, 31
 - HexMap, 51
 - HexTile, 65
- reroll
 - HexMap, 48
- reset
 - InputsHandler, 73
- resource_assessed
 - HexTile, 65
- resource_chip_sprite
 - HexTile, 65
- resource_text
 - HexTile, 65
- SECONDS_PER_FRAME
 - constants.h, 90
- select_outline_sprite
 - HexTile, 66
- sender_address

- Message, 76
- sender_name
 - Message, 76
- sendMessage
 - MessagesHandler, 81
- setTileResource
 - HexTile, 60, 61
- setTileType
 - HexTile, 61, 62
- show_node
 - HexTile, 66
- show_resource
 - HexTile, 66
- sound_map
 - AssetsManager, 16
- soundbuffer_map
 - AssetsManager, 16
- source/ContextMenu/ContextMenu.cpp, 102
- source/ESC_core/AssetsManager.cpp, 103
- source/ESC_core/InputsHandler.cpp, 103
- source/ESC_core/MessagesHandler.cpp, 103
- source/ESC_core/testing_utils.cpp, 104
- source/HexMap/HexMap.cpp, 110
- source/HexMap/HexTile.cpp, 110
- stopTrack
 - AssetsManager, 15
- string_payload
 - Message, 76
- subject
 - Message, 77
- test/ContextMenu/test_ContextMenu.cpp, 111
- test/ESC_core/test_AssetsManager.cpp, 113
- test/ESC_core/test_InputsHandler.cpp, 116
- test/ESC_core/test_MessagesHandler.cpp, 119
- test/HexMap/test_HexMap.cpp, 120
- test_AssetsManager.cpp
 - main, 114
- test_ContextMenu.cpp
 - main, 111
- test_HexMap.cpp
 - main, 121
- test_InputsHandler.cpp
 - main, 117
- test_MessagesHandler.cpp
 - main, 119
- testFloatEquals
 - testing_utils.cpp, 106
 - testing_utils.h, 96
- testGreaterThan
 - testing_utils.cpp, 107
 - testing_utils.h, 96
- testGreaterThanOrEqualTo
 - testing_utils.cpp, 107
 - testing_utils.h, 97
- testing_utils.cpp
 - expectedErrorNotDetected, 105
 - printGold, 105
 - printGreen, 105
 - printRed, 106
 - testFloatEquals, 106
 - testGreaterThan, 107
 - testGreaterThanOrEqualTo, 107
 - testLessThan, 108
 - testLessThanOrEqualTo, 109
 - testTruth, 109
- testing_utils.h
 - expectedErrorNotDetected, 94
 - printGold, 95
 - printGreen, 95
 - printRed, 95
 - testFloatEquals, 96
 - testGreaterThan, 96
 - testGreaterThanOrEqualTo, 97
 - testLessThan, 98
 - testLessThanOrEqualTo, 98
 - testTruth, 99
- testLessThan
 - testing_utils.cpp, 108
 - testing_utils.h, 98
- testLessThanOrEqualTo
 - testing_utils.cpp, 109
 - testing_utils.h, 98
- testTruth
 - testing_utils.cpp, 109
 - testing_utils.h, 99
- texture_map
 - AssetsManager, 16
- TILE
 - ContextMenu.h, 84
- tile_position_x_vec
 - HexMap, 51
- tile_position_y_vec
 - HexMap, 51
- tile_resource
 - HexTile, 66
- TILE_RESOURCE_CUMULATIVE_PROBABILITIES
 - constants.h, 90
- tile_sprite
 - HexTile, 66
- tile_type
 - HexTile, 66
- TILE_TYPE_CUMULATIVE_PROBABILITIES
 - constants.h, 90
- TileResource
 - HexTile.h, 101
- TileType
 - HexTile.h, 102
- toggleResourceOverlay
 - HexMap, 48
 - HexTile, 63
- track_map
 - AssetsManager, 17
- visual_screen
 - ContextMenu, 31
- visual_screen_frame_bottom
 - ContextMenu, 31

VISUAL_SCREEN_FRAME_GREY
 constants.h, [89](#)
visual_screen_frame_left
 ContextMenu, [32](#)
visual_screen_frame_right
 ContextMenu, [32](#)
visual_screen_frame_top
 ContextMenu, [32](#)