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2048.cpp File Reference

```
#include <fstream>
#include <iostream>
#include <string>
#include <iomanip>
#include <sstream>
#include <functional>
#include "../2048.h"
#include "../utility.h"
```

## Classes

struct [Tile](#)

## Macros

#define [CONTROL\\_STRING](#) "WASDQ"

## Typedefs

typedef struct [Tile](#) [tile](#)

## Macro Definition Documentation

#define CONTROL\_STRING "WASDQ"

## Typedef Documentation


typedef struct [Tile](#) [tile](#)

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2048.h File Reference

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## Classes

class [G2048](#)

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2048.h

[Go to the documentation of this file.](#)

```

1 #ifndef __2048__
2 #define __2048__
3
4
5
6 struct Tile;
7
8 class G2048 {
9 private:
10
11
12
13 int board[4][4];
14
15
16
17 int score;
18
19
20
21 char* filename;
22
23
24
25
26 void addTile();
27
28
29
30
31
32 char getInput();
33
34
35
36
37
38 bool move(char direction);
39
40
41
42 void drawBoard();
43
44
45
46
47 bool hasReached2048();
48
49
50
51
52
53 bool hasMove();
54
55
56
57
58 void loadGame();
59
60
61
62
63
64 void saveGame();
65
66 /*****
67 PLACE ANY ADDITIONAL MEMBER DECLARATIONS HERE
68 *****/
69
70
71
72
73
74
75 bool hasAvailableTile;
76
77
78
79
80
81
82
83 Tile randomAvailableTile();
84
85 public:

```

Classes

```

86  /*
87  This initializes a game of 2048 - the board, score, and filename.
88  When the filename given is valid, check for the existence of the file,
89  and load the values contained in it accordingly.
90  Use the same file to save the game upon quitting.
91  */
92  G2048(char* filename);
93  /*
94  This function starts/resumes a game of 2048.
95  */
96  void startGame();
97  };
98
99 #endif

```

G2048::filename  
char \* filename  
Filename where the game will be saved.  
**Definition:** 2048.h:21

G2048::saveGame  
void saveGame()  
Saves the game.  
**Definition:** 2048.cpp:323

G2048::G2048  
G2048(char \*filename)  
**Definition:** 2048.cpp:24

G2048::getInput  
char getInput()  
Prompts input character from the player then returns the value.  
**Definition:** 2048.cpp:107

G2048::hasReached2048  
bool hasReached2048()  
Checks if the game is already won.  
**Definition:** 2048.cpp:268

G2048::drawBoard  
void drawBoard()  
Prints in the terminal the current state of the board.  
**Definition:** 2048.cpp:250

G2048::hasAvailableTile  
bool hasAvailableTile  
Whether there is still an available tile.  
**Definition:** 2048.h:75

G2048::board  
int board[4][4]  
Board Datastructure.  
**Definition:** 2048.h:13

G2048::hasMove  
bool hasMove()  
Checks if there is still a possible move.  
**Definition:** 2048.cpp:279

G2048::randomAvailableTile  
Tile randomAvailableTile()

Get Random Available Tile.

**Definition:** 2048.cpp:74

G2048::addTile

void addTile()

Adds random tile to the board after every turn.

**Definition:** 2048.cpp:100

G2048::move

bool move(char direction)

Moves the tiles in the specified direction.

**Definition:** 2048.cpp:117

G2048::loadGame

void loadGame()

Loads the game.

**Definition:** 2048.cpp:306

Tile

**Definition:** 2048.cpp:14

G2048::startGame

void startGame()

**Definition:** 2048.cpp:30

G2048

**Definition:** 2048.h:8

G2048::score

int score

Current Score for the Game.

**Definition:** 2048.h:17



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Class List

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

[CG2048](#)

[CTile](#)



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## G2048 Member List

This is the complete list of members for [G2048](#), including all inherited members.


<a href="#"><u>addTile()</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>board</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>drawBoard()</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>filename</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>G2048(char *filename)</u></a>	<a href="#"><u>G2048</u></a>
<a href="#"><u>getInput()</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>hasAvailableTile</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>hasMove()</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>hasReached2048()</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>loadGame()</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>move(char direction)</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>randomAvailableTile()</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>saveGame()</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>score</u></a>	<a href="#"><u>G2048</u></a> private
<a href="#"><u>startGame()</u></a>	<a href="#"><u>G2048</u></a>

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[Public Member Functions](#) | [Private Member Functions](#) | [Private Attributes](#) | [List of all members](#)

G2048 Class Reference

```
#include <2048.h>
```

## Public Member Functions

[G2048](#) (char \*[filename](#))

void [startGame](#) ()

## Private Member Functions

void [addTile](#) ()

Adds random tile to the board after every turn. [More...](#)

char [getInput](#) ()

Prompts input character from the player then returns the value. [More...](#)

bool [move](#) (char direction)

Moves the tiles in the specified direction. [More...](#)

void [drawBoard](#) ()

Prints in the terminal the current state of the board. [More...](#)

bool [hasReached2048](#) ()

Checks if the game is already won. [More...](#)

bool [hasMove](#) ()

Checks if there is still a possible move. [More...](#)

void [loadGame](#) ()

Loads the game. [More...](#)



void [saveGame](#) ()

Saves the game. [More...](#)

[Tile](#) [randomAvailableTile](#) ()

Get Random Available [Tile](#). [More...](#)

## Private Attributes

int [board](#) [4][4]

Board Datastructure. [More...](#)

int [score](#)

Current Score for the Game. [More...](#)

char \* [filename](#)

Filename where the game will be saved. [More...](#)

bool [hasAvailableTile](#)

Wheter there is still an available tile. [More...](#)

## Constructor & Destructor Documentation

G2048::G2048 ( char \* *filename* )

## Member Function Documentation

void G2048::addTile ( ) private

Adds random tile to the board after every turn.

Adds tile of value 2 or 4 to the board every turn.

void G2048::drawBoard ( ) private

Prints in the terminal the current state of the board.

char G2048::getInput ( ) private

Prompts input character from the player then returns the value.

Input represents the direction to take or quit.

Returns

Input character

bool G2048::hasMove ( ) private

Checks if there is still a possible move.

There is a possible move when there is still an empty tile. Or if it is still possible to combine tiles.

`bool G2048::hasReached2048 ( ) private`

Checks if the game is already won.

Returns

Is there a 2048 in the board?

`void G2048::loadGame ( ) private`

Loads the game.

Loads the game from the filename specified.

`bool G2048::move ( char direction ) private`

Moves the tiles in the specified direction.

Computes and updates the score.

Returns

Boolean on wheter the board has changed (move is valid).

Tile `G2048::randomAvailableTile ( ) private`

Get Random Available Tile.

Sets hasAvailableTile.

See also

hasAvailableTile

Returns

Random Tile from the board. Returns Sentinel value of tile.x = -1 when there is no available blank tile.

`void G2048::saveGame ( ) private`

Saves the game.

Saves the game to the filename specified. Prompts user if filename is NULL.

`void G2048::startGame ( )`

## Member Data Documentation

`int G2048::board[4][4] private`

Board Datastructure.

Represents the 4x4 board

`char* G2048::filename private`

Filename where the game will be saved.

bool G2048::hasAvailableTile private  
Whether there is still an available tile.

Value set every game loop .

See also

[randomAvailableTile](#) Checked to see if there is an available [tile](#).

int G2048::score private  
Current Score for the Game.

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

- [2048.h](#)
- [2048.cpp](#)



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[G](#)

[G2048](#)

[Title](#)

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File List

Here is a list of all files with brief descriptions:

[2048.cpp](#)

[2048.h](#)

[main.cpp](#)

[utility.cpp](#)

[utility.h](#)



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Here is a list of all class members with links to the classes they belong to:

- [addTile\(\)](#) : [G2048](#)
- [board](#) : [G2048](#)
- [drawBoard\(\)](#) : [G2048](#)
- [filename](#) : [G2048](#)
- [G2048\(\)](#) : [G2048](#)
- [getInput\(\)](#) : [G2048](#)
- [hasAvailableTile](#) : [G2048](#)
- [hasMove\(\)](#) : [G2048](#)
- [hasReached2048\(\)](#) : [G2048](#)
- [loadGame\(\)](#) : [G2048](#)
- [move\(\)](#) : [G2048](#)
- [randomAvailableTile\(\)](#) : [G2048](#)
- [saveGame\(\)](#) : [G2048](#)
- [score](#) : [G2048](#)
- [startGame\(\)](#) : [G2048](#)
- [value](#) : [Tile](#)
- [x](#) : [Tile](#)
- [y](#) : [Tile](#)

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- [G2048\(\)](#) : [G2048](#)
- [getInput\(\)](#) : [G2048](#)
- [hasMove\(\)](#) : [G2048](#)
- [hasReached2048\(\)](#) : [G2048](#)
- [loadGame\(\)](#) : [G2048](#)
- [move\(\)](#) : [G2048](#)
- [randomAvailableTile\(\)](#) : [G2048](#)
- [saveGame\(\)](#) : [G2048](#)
- [startGame\(\)](#) : [G2048](#)


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- board : [G2048](#)
- filename : [G2048](#)
- hasAvailableTile : [G2048](#)
- score : [G2048](#)
- value : [Tile](#)
- x : [Tile](#)
- y : [Tile](#)

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Here is a list of all file members with links to the files they belong to:

- CONTROL\_STRING : [2048.cpp](#)
- main() : [main.cpp](#)
- tile : [2048.cpp](#)

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- [CONTROL\\_STRING](#) : [2048.cpp](#)

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- [main\(\) : main.cpp](#)

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CS12 MP1: 2048 Documentation

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## Functions

main.cpp File Reference

```
#include "2048.h"  
#include <cstdlib>
```

## Functions

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

## Function Documentation

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


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Here is a list of all namespace members with links to the namespace documentation for each member:

- `char_in_string()` : [utility](#)
- `num_to_str()` : [utility](#)
- `rand_int()` : [utility](#)
- `repeat()` : [utility](#)


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- `rand_int()` : [utility](#)
- `repeat()` : [utility](#)

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## Namespace List

Here is a list of all namespaces with brief descriptions:

[Nutility](#)



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## Functions

utility Namespace Reference

## Functions

std::string [repeat](#) (int n, std::string str)  
Repeats string n times. [More...](#)

bool [char\\_in\\_string](#) (char needle, std::string haystack)  
Checks if char is in string. [More...](#)

int [rand\\_int](#) (int a, int b)  
Random Integer within Range (inclusive) [More...](#)

std::string [num\\_to\\_str](#) (int)  
Converts Integer to String. [More...](#)

## Function Documentation

```
bool utility::char_in_string ( char      needle,
                             std::string haystack
                             )
```

Checks if char is in string.

### Parameters

*needle* Character to find.  
*haystack* String to find needle in.

### Returns

Boolean wheter or not needle is in haystack.

```
std::string utility::num_to_str ( int t )
```

Converts Integer to String.

```
int utility::rand_int ( int a,
                       int b
```

)

Random Integer within Range (inclusive)

## Parameters

a minimum range.

b maximum range (inclusive).

## Exceptions

InvalidArgumentException When  $b < a$ 

## Returns

Random number such that  $a \leq n \leq b$ .

```
std::string utility::repeat ( int      n,
                             std::string str
                             )
```

Repeats string *n* times.


## Parameters

*n* How many times string is repeated.*str* String to repeat.

## Returns

String repeated *n* times.

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Tile Member List

This is the complete list of members for [Tile](#), including all inherited members.

[value](#) [Tile](#)

[x](#) [Tile](#)

[y](#) [Tile](#)


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[Public Attributes](#) | [List of all members](#)

Tile Struct Reference

## Public Attributes

int [x](#)x coordinate on board [More...](#)int [y](#)y coordinate on board [More...](#)int [value](#)actual value of tile [More...](#)

## Member Data Documentation

int Tile::value

actual value of tile

int Tile::x

x coordinate on board

int Tile::y

y coordinate on board

---

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

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- 

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utility.cpp File Reference

```
#include "../utility.h"
#include <string>
#include <sstream>
#include <stdexcept>
```

## Namespaces

[utility](#)

## Functions


std::string [utility::repeat](#) (int n, std::string str)Repeats string n times. [More...](#)bool [utility::char\\_in\\_string](#) (char needle, std::string haystack)Checks if char is in string. [More...](#)int [utility::rand\\_int](#) (int a, int b)Random Integer within Range (inclusive) [More...](#)std::string [utility::num\\_to\\_str](#) (int)Converts Integer to String. [More...](#)

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utility.h File Reference

#include &lt;string&gt;

[Go to the source code of this file.](#)

## Namespaces

[utility](#)

## Functions

std::string [utility::repeat](#) (int n, std::string str)Repeats string n times. [More...](#)bool [utility::char\\_in\\_string](#) (char needle, std::string haystack)Checks if char is in string. [More...](#)int [utility::rand\\_int](#) (int a, int b)Random Integer within Range (inclusive) [More...](#)std::string [utility::num\\_to\\_str](#) (int)Converts Integer to String. [More...](#)

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utility.h

[Go to the documentation of this file.](#)

```

1 #ifndef UTILITY_H_
2 #define UTILITY_H_
3
4 #include <string>
5
6 namespace utility {
12  std::string repeat(int n , std::string str);
13
19  bool char\_in\_string(char needle, std::string haystack);
20
27  int rand\_int(int a, int b);
28
31  std::string num\_to\_str(int);
32 }
33
34 #endif // UTILITY_H_

```

[utility::num\\_to\\_str](#)

std::string num\_to\_str(int t)

Converts Integer to String.

**Definition:** utility.cpp:27[utility::rand\\_int](#)

int rand\_int(int min, int max)

Random Integer within Range (inclusive)

**Definition:** utility.cpp:20[utility::repeat](#)

std::string repeat(int n, std::string str)

Repeats string n times.

**Definition:** utility.cpp:9[utility::char\\_in\\_string](#)

bool char\_in\_string(char needle, std::string haystack)

Checks if char is in string.

**Definition:** utility.cpp:16[utility](#)**Definition:** utility.cpp:8