

Programming Project: Game

Complete the partially implemented “Battle Boat” Game

Programming Project: Game

Battle Boat is similar to classic game Battleship
Smaller and simpler



```
Enter grid Coordinates (row, column) of torpedo target grid square
Please enter grid row number:
2
Please enter grid column number:
2
|~|~|~|~|
|~|~|~|~|
|~|~|*|~|
|~|~|~|~|
Location row: 2; column: 2 is a miss.
Magazine: 9 torpedoes
```

Programming Project: Game

Preparation for CPSC-350

Introduces

- 2-D arrays

- Tuples

- Classes

- Game Design

- Random Numbers

- Conditional Compilation

```
Enter grid Coordinates (row, column) of torpedo target grid square
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2
Please enter grid column number:
2
|~|~|~|~| |
|~|~|~|~|
|~|*|X|*|~|
|~|~|~|~|
Hit! Kaboom!
Victory!
```

```
Enter grid Coordinates (row, column) of torpedo target grid square
Please enter grid row number:
1
Please enter grid column number:
1
|~|~|~|~| |
|~|*|*|~|*|
|~|~|*|*|*|
|*|*|*|*|~|
Location row: 1; column: 1 is close!
Magazine: 0 torpedoes
|V|~|~|~| |
|~|*|*|~|*|
|~|~|*|*|*|
|*|*|*|*|~|
Torpedoes expended
Game over
```

Programming Project: Game

Game is partially implemented

Follow instructions in PDF

Look for TODO comments in code

```
// //////////////////////////////////////  
// TODO: WRITE WHILE LOOP TO ASK IF USER WISHES TO PLAY ANOTHER GAME  
//  
// Within the while loop, hve the Game object, game, call the play() member function.  
// Then prompt the user if they want to play another game. If so, iterate through the  
// while loop again, otherwise, set bPlay to false (so that the while loop will cease iterating).  
// //////////////////////////////////////
```

Programming Project: Game
CPSC 298-6 Programming in C++
jbonang@chapman.edu

Introduction

In this programming project, you'll implement a computer game called "Battle Boat" as a C++ class. A framework for the game has been implemented for you but is incomplete. You'll need to finish the implementation.

"Battle Boat" is similar to the classic game "Battleship" but much simpler.



Battleship game played by crewmembers of USS George H.W. Bush

The opponent has only one boat, albeit a stealthy, autonomous, robotic boat, that is hidden in an ocean represented by a two-dimensional grid. The game is a command line game and all output is rendered in ASCII (American Standard Code for Information Interchange) characters. For example, the grid is shown below, with the tilde character ~ representing waves. Each grid square is flanked by a vertical bar character to help the user see the squares.



You control another boat with a magazine of torpedoes and must hunt the Battle Boat.

Programming Project: Battle Boat

Go to Canvas

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|~|~|*|*|*|
|*|*|*|*|~|
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Tuples

Some languages like Ruby let you return multiple values

Can you do this in C++?

Yes; using tuples

C++ has a means to do this too: tuples

A tuple is a fixed sized collection of heterogeneous values

Tuples

If a function needs to return more than one value, it can return a tuple.

Function returns a tuple containing two values: (row & column)

main calls function that returns tuple, receiving two values using the tie function

```
std::tuple<int, int> getGridCoordinate()
{
    int iRow = 1;
    int iColumn = 2;

    std::tuple<int, int> tupleRowColumn(iRow, iColumn);
    return tupleRowColumn;
}
```

Need
#include <tuple>

```
int main()
{
    int iRow;
    int iColumn;

    std::tie(iRow, iColumn) = getGridCoordinate();

    std::cout << iRow << std::endl;
    std::cout << iColumn << std::endl;
}
```

1
2

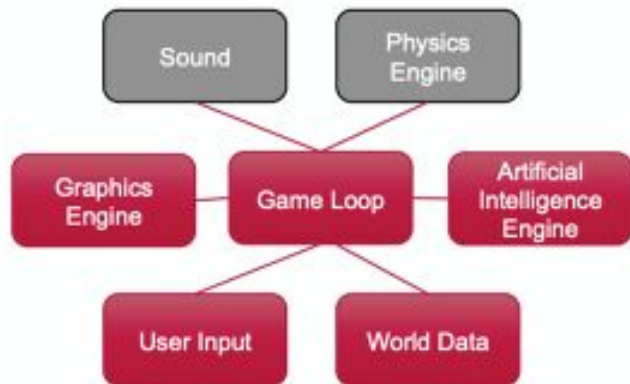
Output

Tuple template class is used to store a set of 2 integers, corresponding to the row and column numbers of a grid location. Must use angle brackets.

```
std::tuple<int, int> fireTorpedo();|
```

Game Architecture

Battle Boat incorporates all the components of a modern computer game except Sound and Physics Engine



Block diagram conveying the high-level design or architecture of a generic computer game. Each block is a major component of the system

```
std::tie(iRow, iColumn) = this->fireTorpedo();
```

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Programming Project: Game
CPSIC 295-6 Programming in C++
jboncamp@chapman.edu

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You control another boat with a magazine of torpedoes and must hunt the Battle Boat.

Programming Project: Battle Boat

Things to Know and Common mistake





```
⊗ student@HCEF21-40 Class % g++ -o Game_incomplete Game_in  
In file included from Game_incomplete.cpp:12:  
./Game.h:83:7: error: no template named 'tuple' in namespace 'std'  
    std::tuple<int, int> fireTorpedo();  
      ~~~~~^  
./Game.h:130:7: error: no template named 'tuple' in namespace 'std'  
    std::tuple<int, int> promptForGridCoord();  
      ~~~~~^  
Game_incomplete.cpp:78:36: error: expected '(' for function-style cast  
    a_cGrid [iRow] [iColumn] = char '~';  
                                ~~~~~^
```



#include <tuple> Not working?

```
g++ -o -std=c++17 {filename}.cpp
```

```
g++ -o -std=c++17 Game.cpp main.cpp
```

You most likely have c++11 installed, but c++17 is downloaded and you can use it.