

# CSE 102 Spring 2025 – Computer Programming Assignment 5

**Due on April 09, 2025 at 23:59**

## Problem Description:

This assignment requires you to implement a Battleship Game Simulation in C. You will create a 10x10 grid where four ships of different sizes are randomly placed, and the user will attempt to sink them by firing shots at specific coordinates. The game continues until all ships are sunk.

### Your program must include the following features:

1. Randomly place four ships:
  - 1 ship of size 4
  - 2 ships of size 3
  - 1 ship of size 2
2. Ships can be placed horizontally or vertically.
3. Ships must not overlap.
4. User fires at coordinates until all ships are sunk.
5. The game board updates dynamically.
6. Each turn, the program informs the user if they hit or missed.
7. A ship is only considered sunk when all of its cells are hit.
8. The program logs the number of shots taken.
9. Ships' initial positions are stored in `ships.txt`.
10. User moves and game progress are logged in `battleship\_log.txt`.
11. User can quit at any time by entering `X`.
12. When a ship is completely sunk, a message should indicate which ship size was destroyed.
13. After all ships are sunk, the user can start a new game (`N`) or exit (`X`).

## Game Rules:

### 1. Game Board Initialization (20 pts):

- The board is a 10x10 grid initialized with `-` representing empty spaces.
- Ships (`S`) are randomly placed and stored in `ships.txt`.
- User sees an updated version of the board after each move, displaying hits (`X`) and misses (`O`).

### 2. User Interaction & Gameplay (50 pts):

- User enters a coordinate (e.g., `3 5`).
- If the coordinate contains a ship (`S`), the board updates with `X`, and the user is notified.
- If the coordinate is empty, the board updates with `O`, indicating a miss.

- A ship is considered sunk when all its parts have been hit.
- Each time a ship is fully destroyed, a message like 'Congratulations! You have sunk a X-cell ship!' should be displayed.
- Once all ships are sunk, the game concludes with a message showing the total shots taken.

### 3. Logging & Saving Data (20 pts):

- `ships.txt` stores ship locations at the start of the game.
- `battleship\_log.txt` logs each move and the final number of shots taken.

### 4. Exit & Replay Options (10 pts):

- At any time, the user can enter `X` to exit the game.
- When all ships are sunk, the program prompts: 'Press `N` to start a new game or `X` to exit.'

### IMPORTANT NOTES:

- Submit your homework as a zip file named as your student id (StudentID.zip) and this file should include:
  - YourStudentID.c file
  - A reports containing the screenshots of running code and generated outputs.
- Programs with compilation errors will get 0.
- The output format must be as given, do not change it.
- Compile your work with given command “gcc --ansi your\_program.c -o your\_program”.