

# Group 20 Project Instructions

## *Prerequisites to running our project:*

- A modern internet browser (like Chrome or Firefox, or in the most dire cases: Edge)
- H2 Database Console - This should be installed when running the .jar files but in case this does not work then you can download it at <http://www.h2database.com/html/download.html>, this is necessary to running our project since all data is saved in the user's machine
- Capability of running .jar files, most (if not all) shells have this capability.
- Node.js : <https://nodejs.org/en/download/>
- Angular CLI: Install using node package manager (npm install -g @angular/cli)

## *How to run our project:*

- Run jar file with `java -jar bshvps-0.0.1.jar`
- In a browser, navigate to `localhost:8080/`

## *Features of the App*

### **Rules of the game**

#### Original Rules of Battleship

Each player has their own 10 X 10 grid, and has five ships to place on their grid.

The five ships are:

- Carrier, with five squares
- Battleship, with four squares
- Cruiser, with three squares
- Submarine, with three squares
- Destroyer, with two squares

Ships are placed in horizontal or vertical lines. Diagonal ships are not allowed by the rules of Battleship.

On their turn, each player chooses a position on their opponent's board to make an attack.

- If this chosen space is occupied by a ship, that ship is considered "hit," and if every square a ship occupies is hit, then ship is considered "sunk" and out of the game.
- If there is no ship in that space, then that is considered a "miss".
- A player only has one action per turn.

This pattern repeats until all of an opponent's ships are sunk

#### Special rules we've added

Instead of attacking, users can choose to move one of their ships, however:

- A ship that is hit cannot move
- A ship can only move forward/backward in the direction it is oriented (i.e. horizontal/vertical, no turning).
- If a player attempts to move a ship that cannot move or attempts to move them into an invalid space, the ship does not move and the player's turn is wasted

#### Multiple Bots

The player can choose to play against up to 3 bots instead of the traditional one-on-one game.

- All bots will have the same level AI
- The bots will also try to attack each other
- Once all of a bots' ships are sunk, that bot is out and no longer can make any moves
- The game ends when the user is eliminated or when all other opponents have been eliminated

#### Other Features

- Statistics page: users can see their previous game history listed in a convenient table
- Dark Theme: users can forgo the default color scheme in favor of the dark theme, which changes the styles on each page into darker colors. This applies to all options such as full screen and the game timer. The formatting for dark mode is a gray background (instead of the default white) with white text (instead of the default black).
- Timer: users can choose to add a timer to their game while they play. The timer is formatted to display the time as "<minutes>:<seconds>".
- Full screen: Users can choose to play the game in a full screen mode. This option persists until the user presses the escape key or presses the option to leave full screen mode.

## Examples

# of Players	Hit Percentage	Miss Percentage	Total Turns	Time (sec)	Winner	Player Types
2	0.34	0.65	49	32	Player	NaivePlayer, Player
3	0.29	0.7	75	106	HunterPlayer	HunterPlayer, Player, HunterPlayer

Figure 1: Statistics Page Table

Above is an example of what the statistics page's table should look like. Some key things to take note of:

- Number of players is a single digit and includes all players in the game
- Hit/Miss Percentages are both decimal values, and should add up to  $1.00 \pm 0.1$  (the margin of error would be due to rounding done in the calculations). Also, the percentage should be formatted either like 0.## or 0.#, depending on the value
- Total turns is a whole number that should be the total number of turns for the entire game
- Time is in seconds, rounded to the nearest whole second
- Winner is the Player Type of the winner of the game
  - Player refers to the user
  - HunterPlayer refers to the Hunter AI
  - NaivePlayer refers to the Naive AI
- Player Types refers to the different types of players in the game (including the user)
  - It should be formatted like the image shows: as a comma separated list with the format [player type], [player type], ...
  - There is exactly one comma and one whitespace character between each player type, and there is no comma at the end of the list
  - The order is not important, as long as they are all listed

User Name

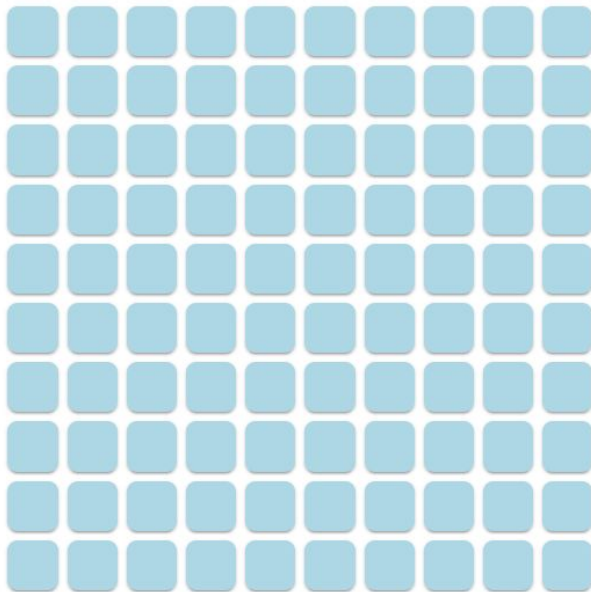
Victory Message

Select Enemy AI  
 Normal ▼

# of opponents  
 1 ▼

**Begin Game**

Place your carrier (5 spaces left)



The image to the left shows the New Game Window. To start the game, the user must input a User Name and a Victory Message, and place all of their ships appropriately in the grid.

Also, users can choose between two considerably different AIs to play against, Normal (also referred to as Naive) and Hunter.

Users can also choose to play against more than one opponent. Extra opponents will also attack each other, not just the user.

Figure 2: New Game Window

**Important Notes:**

- Ships are placed by clicking on the blue tiles in a continuous line
- Ships must be placed either horizontally or vertically
- Ships cannot overlap
- Once a ship space is placed, it cannot be undone
- The order for placing ships is:
  - Carrier (5 spaces)
  - Battleship (4 spaces)
  - Cruiser (3 spaces)
  - Submarine (3 spaces)
  - Destroyer (2 spaces)

- User Name and Victory Message can be anything, and do not persist through each game

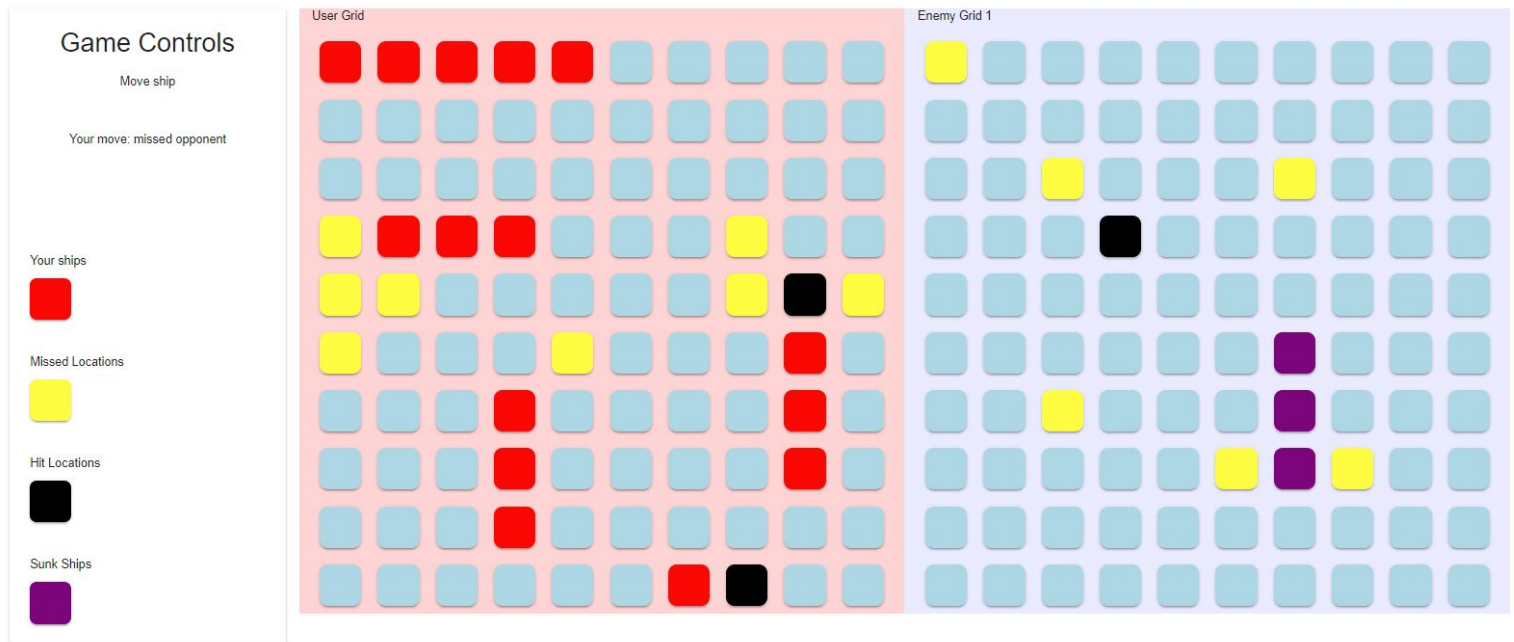


Figure 3: Game Window Example 1

Above is an example of what the game window will look during the game. The User's grid will always be displayed in the upper left corner and will show their ships in red.

### Attacks

- Attacks are the default option for a turn
- Attacks are made by clicking a tile on an enemy grid
- Attacks can be repeated on the same space (this important since ships can move)
- If the attack was a miss, the grid cell will change to yellow; if the attack was a hit, the grid will either turn black or purple
  - Purple indicates that the ship has been sunk, and all cells in the sunk ship will change to purple as well

### Moving

- Select the 'Move ship' option in the Game Controls box to start this option
- Notice that the box's contents change like so in the image to the right
- As it states, the User cannot move a ship that has been hits, and attempting to do so will waste their turn

**Select a ship you would like to move. If the ship is hit (contains a black cell), your move will be invalid and you will waste a turn.**

- Select a valid ship (all ships have turned blue at this point as well)
- The box's contents now change to the image on the right
- Keep in mind the what the front and back of the ship are, as that will determine what moving forward/backward will look like
  - Ships also cannot move outside the boundaries of the grid, attempting to do so will be a wasted turn
- Upon selecting an option, the ship's location will be updated accordingly
  - Ships can only move one over one grid cell at a time, but can move as many times as their position will allow (and if they haven't been hit yet)

**Move the selected ship forward or backward. Pink represents the back of the boat, while dark red represents the front of the boat.**

Move forward

Move backward

### *Endgame*

- If the User has been eliminated or all other opponent's have been eliminated, the user is alerted with a message regarding their win or loss
- The game is now over, the user must manually press the 'Go Home' option in the upper right corner to return to the Main Menu

### *Multiplayer*

- Multiplayer works essentially the same as one-on-one, just with more grids and turns going on
- Each player makes their turn in sequential order, starting with the User
- Opponent's will also attack each other, rather than ganging-up on the User
- Once an opponent has been eliminated, they no longer make any moves
- All opponents must be eliminated to achieve victory

Another Note: the User can choose to reset the game at any time by going back to the Main Menu before the game ends. This can also be done at the New Game Window in case the User makes a mistake placing their ships.