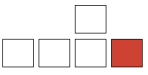


Battleships 3

Our product Battleships has a steadily growing fan base. In order to maintain and strengthen our competitive edge, we need to add new features to the game, while at the same time improving the internal design. These transformations are to occur gradually, in a series of increments.

In the first increment, you have the following important goals:

1. Features:

- A new type of ship will be introduced: the submarine - takes up five blocks on the grid, as follows: . In addition, a submarine can be also submerged, and thus be placed on the grid, **under** any other type of surface ship.
- A new type of weapon is introduced: “the space laser”. It is fired from a network of geo-stationary satellites, and unlike the conventional bombs that we have until now, they penetrate the water, being able to hit both a surface ship, and a sub that is placed below it at the same time (i.e. the bomb can only hit the surface). The player receives the activation codes for the space laser only after sinking the first enemy ship (i.e. this weapon is an upgrade, and replaces the conventional bomb in the player’s arsenal).

2. Design Improvements:

- Perform a restructuring of our current code base, as to facilitate the future adding of a graphical user interface (GUI), by implementing the architectural pattern “Model-View-Controller”. In the context of the existing, console-based and output-only interface, the first step should be a clear separation between the model component on one side, and the view+controller components on the other side.
- Implement a “Façade” for the Model component.
- Make use of the Observer pattern in order to decouple event generators from event consumers. For example, possible candidates for restructuring to the observer pattern would be: the Fleet as Ship observer (i.e. when a ship decides to sink, it notifies the Fleet with an SOS), or the Ship as a Cell observer (i.e. when a cell is attacked, it notifies all relevant Ships). These are just potential cases for applying the patterns. **The decision will depend on your particular design solution**, and is therefore left to you...