About the Game:

The game has two modes: single or two players. In single player mode, human player can choose easy mode (AI random hits spot) or hard mode(AI uses smart strategy described in the lab write-up). In two-player mode, game randomly picks a user to start placing the ships (player can tap twice on the ship to rotate it). After placing the ships, user clicks on "placement done" button to let the other user place ships. In the homepage, user can also click on "scoreboard" to see best five scores. There is also a section in the homepage that explains how to play the game.

About the Design:

Initially, I have considered about using MVC framework for this game. But I think the models(such as ships) are too simple. They can simply be represented by buttons on the storyboard. So I decide to use just Views and Controllers. I have four views for homepage, single player mode, double player mode and scoreboard. Each view has a view controller.

I use storyboard to create views for this game. To design the grid, I first create a 10 by 10 grid using UIImageView with image "bluegrid.png". I set the width and height to be 400 so that each cell has width 40 and height 40. Also, we can compute correct ship size based on those numbers. For ships, I use buttons to represent them. When initializing the game, 100 buttons will be created on the grid by computing each of their corresponding coordinates and selectors are added to those buttons to handle button press event. For ships, I add touch event handlers for dragging, dropping and tapping the ship.

After the game is successfully initialized, players will switch turns to hit each other's ships. During the game, two grids are displayed. Current player can see his ships colored with purple and markers ("X" and "O") from his enemy on his own grid. He can see his own markers on the other grid(enemy's grid) and is able to click on some location to hit enemy's ocean. But he cannot click on his own grid because buttons are disabled. When a whole ship is down, the ship will be displayed and colored with grey.

About consideration of user-friendly design:

Ship Placement: I create a method to adjust ship location if player does not drop ship to a proper location when placing the ships. If player places the ship out of the grid or places the ship on another ship, I use alert view to send a message.

Score system: I add scoring to this game and scores are displayed up to time during the game. When game is over, winner score is recorded and saved in NSUserDefaults. Players can see top five best scores after clicking on "scoreboard" in the homepage.

Game orientation: I choose to use landscape view for this game because it is better to put two grids side by side. Therefore when launching the app, I configure the default orientation to be landscape. Also, this game is designed for iPad due to its screen size.

Graphics: When a cell is hit by some player, I create an explosion effect in that cell. The grid is filled with images of ocean. Every view has its corresponding background image.

About AI algorithm:

When AI first partially hits a ship, hard strike mode will begin. AI first compute all possible moves in four directions(left, right, up, down). In the first round of hard strike mode, AI will randomly pick an attack direction. Then based on whether last attack is a hit or not, AI will confirm an attach direction and remove all possible moves in the perpendicular directions from its candidate list. If AI successfully strikes down a whole ship, its mind will be reset. In other situations, AI will perform random hit.

Some additional notes:

In the double-player mode, after one player finishes his turn, he should click on "switch turn" button and hand the iPad to the other player immediately. During the time of transferring the iPad, I design to make two grids blank so that no player can see his enemy's ship. Also, if player doesn't click on the switch turn button and tries to attack multiples times in his turn, the game will give him an alert message. In this case, player is only allowed attack once in his turn. Since the lab requires me to display player's ships during the game(I asks a TA, Robbie, and he says we need to show ships during the game), I have to implement that way. But from my point of view, I think it is better not to show ships because player cannot change ship placement after game starts anyway. If you think it is better not to show player's ships during the game, you can simply comment out some lines of code in the startGame() method(I have some comments there to tell you how to do that).