| Function Name | emptyGrid |
| --- | --- |
| Parameters with data types | Rows : int ,cols : int |
| return values and their data types | 2D list of ints |
| Expected functionality in plain text. | It creates an empty grid filled with ones as the values of each cell which indicates that the cell has not been clicked and is empty. |

| Function Name | createShip |
| --- | --- |
| Parameters with data types | No Parameter |
| return values and their data types | 2D list of ints |
| Expected functionality in plain text. | creates a ship and returns a 2D list of its positions on the grid. All ships are three grid cells long (where each cell is a two-element list) and can be placed either vertically or horizontally on the grid. |

| Function Name | checkShip |
| --- | --- |
| Parameters with data types | grid: 2D list of int , ship : 2D list on int |
| return values and their data types | Boolean Value : True or False |
| Expected functionality in plain text. | It checks whether a given ship i.e, coordinates can be added to the grid that is provided. If the ship can be added then it will be True else it will return False. |

| Function Name | addShips |
| --- | --- |
| Parameters with data types | grid: 2D list of int , numShips : int |
| return values and their data types | Grid : 2D list of int |
| Expected functionality in plain text. | It creates numships of random ships and add them to the grid, by using already defined createship and checkship methods. |

| Function Name | makeModel |
| --- | --- |
| Parameters with data types | Dictionary mapping strings to values. |
| return values and their data types | None |
| Expected functionality in plain text. | Used to store data about the board as data["name"] = value |

| Function Name | drawGrid |
| --- | --- |
| Parameters with data types | dictionary mapping strings to values, Tkinter object , Grid : 2-D list of int,showShips: bool |
| return values and their data types | None |
| Expected functionality in plain text. | Draws a grid of rows x cols squares on the given canvas |

| Function Name | makeView |
| --- | --- |
| Parameters with data types | Data : dtictionary, userCanvas: Tkinter object, compCanvas: tkinter object |
| return values and their data types | None |
| Expected functionality in plain text. | It calls drawGrid() two times -once for the computer board and canvas, once for the user board and canvas. |

| Function Name | isHorizontal |
| --- | --- |
| Parameters with data types | ship:2D lists of int. |
| return values and their data types | boolean |
| Expected functionality in plain text. | Takes in a ship and returns True if the ship is placed horizontally, and False otherwise. |

| Function Name | isVertical |
| --- | --- |
| Parameters with data types | ship:2D lists of int. |
| return values and their data types | boolean |
| Expected functionality in plain text. | Takes in a ship and returns True if the ship is placed vertically, and False otherwise. |

| Function Name | getClickedCell |
| --- | --- |
| Parameters with data types | Data: dictionary, event: tkinter object |
| return values and their data types | list of int |
| Expected functionality in plain text. | Takes the simulation's data dictionary and a mouse event, and returns a two-element list holding the row and col of the cell that was clicked. |

| Function Name | drawShip |
| --- | --- |
| Parameters with data types | Data: dictionary, canvas:Tkinter object, ship: 2D list of int |
| return values and their data types | None |
| Expected functionality in plain text. | Takes the data model, a canvas, and a ship 2D list, and draws white cells for each component of the given ship. |

| Function Name | shipIsValid |
| --- | --- |
| Parameters with data types | grid: 2D list of int , ship : 2D list of int |
| return values and their data types | boolean |
| Expected functionality in plain text. | Takes a grid and a ship and determines whether it is legal to place the ship on that grid, returning a Boolean |

| Function Name | placeShip |
| --- | --- |
| Parameters with data types | data : dictionary |
| return values and their data types | None |
| Expected functionality in plain text. | Takes the data model and checks if the current temporary ship is valid If the ship is valid. |

| Function name | clickUserBoard(): |
| --- | --- |
| Function parameters with data types | data(dict),row(int), col(int) |
| Function return values and their data types | None |
| Expected functionality in plain text | It handles a click event on a specific cell. |

| Function name | mousePressed(data,): |
| --- | --- |
| Function parameters with data types | data(dict),event(Object), board(2d list) |
| Function return values and their data types | None |
| Expected functionality in plain text | Lets the user click on cells when a winner hasn't been chosen yet. |

| Function name | updateBoard(): |
| --- | --- |
| Function parameters with data types | data(dict),board(2d list), row(int), col(int), player(str) |
| Function return values and their data types | None |
| Expected functionality in plain text | Updates the given board at (row, col) based on a player's click. If the user clicks on a cell with a value. |

| Function name | runGameTurn(): |
| --- | --- |
| Function parameters with data types | data(dict),row(int),col(int) |
| Function return values and their data types | None |
| Expected functionality in plain text | It manages a single turn of the game after a user clicks on (row, col). First, check whether (row, col) has already been clicked on the computer's board. |

| Function name | getComputerGuess(): |
| --- | --- |
| Function parameters with data types | board(2-D list) |
| Function return values and their data types | cell(list) |
| Expected functionality in plain text | This function takes a grid (the user's board) and should return a cell that the computer will 'click' on that board. |

| Function name | isGameOver(): |
| --- | --- |
| Function parameters with data types | board(2-D list) |
| Function return values and their data types | boolean |
| Expected functionality in plain text | Checks whether the game is over for the given board. The game is done if there are no SHIP\_UNCLICKED cells left in the boarding, in other words when every ship has been clicked. Return True if the game is over for that board, and False. |

| Function name | drawGameOver(): |
| --- | --- |
| Function parameters with data types | data(dict), canvas(Tkinter canvas) |
| Function return values and their data types | None |
| Expected functionality in plain text | It draws a special message on the given canvas if a winner has been chosen. |

| Function name | keyPressed(): |
| --- | --- |
| Function parameters with data types | data(dict), event(Object) |
| Function return values and their data types | None |
| Expected functionality in plain text | Check if the user pressed enter by using the event parameter. If they did, reset the game. |

| Function name | makeModel(): |
| --- | --- |
| Function parameters with data types | data(dict) |
| Function return values and their data types | None |
| Expected functionality in plain text | Checks whether the number of turns is equal to the max number of turns. If it is set to the winner variable in the data. |