

Academic Integrity and MOSS

presented by Ben Laube

What is MOSS?

"Moss (for a Measure Of Software Similarity) is an automatic system for determining the similarity of programs. To date, the main application of Moss has been in detecting plagiarism in programming classes."

How does MOSS work?

- Black Box: we can view the inputs and outputs, but not the internal processes
- Instructors submit files to compare
- System returns HTML pages that detail similarities between files
- Cannot be used to determine if plagiarism or cheating actually occurred
- Highlights similarities, up to instructors to conclude

What can MOSS do?

- **Whitespace insensitivity**
 - Differences in whitespace (indentation/between blocks/etc.) and identifier names are ignored.
- **Noise suppression**
 - Potential matches must be long enough to be considered significant.
- **Position independence**
 - Blocks can match regardless of position in the source files.

What Counts As Cheating?

In the School of Computing at UNL, academic dishonesty can take many forms. A list of examples can be found on the policy webpage.

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- ▶ Talking with peers about what class concepts you should use for the assignment.

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- ▼ Talking with peers about what class concepts you should use for the assignment.

Acting honestly! :)

Hashing things out at a high level is often encouraged in comp sci courses.

Note that "high level" just means "keep it general".

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▼ Posting your solutions online or showing them to peers before submissions close

Acting dishonestly... >:^(

There's a big difference between helping someone debug and helping them rewrite a whole block.

When in doubt, have them reach out to a TA to get help.

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- ▶ Viewing code from a video/forum and writing the same block in your own solution

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▼ Viewing code from a video/forum and writing the same block in your own solution

Acting dishonestly... >:^(

Manually typing the copied code, is the same as using copy/paste shortcuts.

Yes, even if you change the variable names. MOSS still detects this.

Avoiding cmd + c ≠ avoiding copying.

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- ▶ Meeting an instructor or TA in office hours to talk about out how to approach a problem.

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- ▼ Meeting an instructor or TA in office hours to talk about out how to approach a problem.

Acting honestly! :)

This is usually your safest bet when it comes to getting help! We know exactly what kind of solution you should be working toward and can provide tips that won't get you in trouble.

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Acting honestly or dishonestly?

- ▶ Taking code and renaming identifiers or shuffling the order of blocks.

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▼ Taking code and renaming variables or shuffling the order of blocks.

Acting dishonestly... >:^(

This is just copying with slightly more effort put into it.

Might be easy for a human grader to miss, but MOSS detects this.

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Acting honestly or dishonestly?

- ▶ Working with someone on the same source file for a partner assignment

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Acting honestly or dishonestly?

▼ Taking code and renaming variables or shuffling the order of blocks.

Acting honestly! :)

When instructors explicitly allow working together for an assignment, they'll make it clear.

By default, you can safely assume no direct collaboration is allowed on coding assignments.

Grading Overview

For CSCE 155A, assignment grading is done by Learning Assistants (LA's) and managed by Course Leaders (CL's). A general layout of the grading process can be found below:

- Grading is assigned to LA's by a CL after the assignment deadline has passed.
- Once grading is finished and quality checked by a CL, student scores are posted.
- Any student with questions about their grade has up to 10 calendar days after grades are posted to discuss with their respective grader.
 - The grader of an assignment can be found in the submission comments on Canvas.
 - After this period, scores are treated as finalized and future requests by students to revisit their score may be denied.

How Cheating is Caught

1. During grading, LA's will report any suspicions to the CL's.
2. Anything missed by the graders will often be picked up by MOSS.
3. The instructors and CL review all potential matches
 - a. Regardless of how a potential match was identified
4. Decide if the files show enough evidence to flag the student for violating the academic integrity policy.

Getting Flagged

If it is decided that a potential match is an instance of cheating, every student involved will be flagged as being in violation of the academic integrity policy.

Each student will receive a sanction and a submission comment on Canvas explaining the sanction with deadlines for next steps.

Discussion With Instructors

- Any student flagged for cheating should meet with instructors to discuss the situation.
- If you know you did not cheat, this is your time to clear things up and remove the sanction.
- If a student does not reach out by the deadline given, then the sanction stands.

Note: being flagged for a violation should not be taken lightly. Possible academic dishonesty is reviewed by multiple members of the instructor team and discussed at length before being flagged.

Consequences

A complete explanation of possible consequences for policy violations can be found on the policy webpage. In general, the SoC uses a three-strike system

1. For a first offense, the student will receive no credit for the assignment.
 - a. The sanction can increase straight to a failing grade in the class if the violation was bad enough.
2. For a second offense, the student will receive a failing grade in the class and will not be permitted to drop the class.
 - a. F stays on transcript.
3. For a third offense, the student will be expelled from their computing major or minor and will be barred from enrolling in future SoC courses.

All offenses will be reported to the Office of Student Conduct, regardless of the sanction imposed.

Appeals Process

- You are allowed to challenge academic dishonesty sanctions
 - For example, if you believe you are not guilty or feel the sanction was worse than called for.
- Contact the Chair of the School of Computing
- Chair assigns the case to an appropriate committee
- Committee meets with the student and the instructors to review the evidence, and make a recommendation to the instructor regarding the incident
- The instructor will review the recommendation, and may or may not amend the original decision.

If a student is still not satisfied with the instructors decision, they have the right to appeal at the university level.

Further Reading

- SoC academic integrity policy
- University of Nebraska Student Code of Conduct
- Moss documentation

Sample MOSS Results



Student 1

```

1 # student01 - CSCE155A
2
3 from random import randint
4
5 # define a list for storing the board configuration
6 board = []
7
8
9 # function to create board
10 def create_board(size):
11     for x in range(size):
12         board.append(["-"] * size)
13
14
15 def random_row(size):
16     return randint(0, size - 1)
17
18
19 def random_col(size):
20     return randint(0, size - 1)
21
22
23 # function that places ship # in the random x,y coordinates
24 def place_ship():
25     x = random_row(size)
26     y = random_col(size)
27     board[x][y] = "X"
28
29
30 # function that displays board configuration
31 def display_board(brd):
32     for r in brd:
33         print(" ".join(r))
34
35
36 # function that places X if there is ship in specified loc.
37 # Otherwise, it places 0
38 def launch_missile(board, row, col):
39     if board[row][col] == "X":
40         print("Boom! You hit a ship!")
41         board[row][col] = "!"
42     else:
43         print("You missed! Try again.")
44         board[row][col] = "0"
45     return board
46
47
48 print("Let's play Battleship!")
49 # prompt and accept board size
50 size = int(input("Enter board size: "))
51 create_board(size)
52 total_tiles = size * size
53 # number of ships must be less than one-fifth of number of titles
54 numShips = int((1 / 5) * total_tiles)
55 for i in range(numShips + 1):
56     place_ship()
57     display_board(board)
58
59 # prompt and accept location of missile
60 for turn in range(size * size):
61     coord_x, coord_y = (int(i) for i in input("Pick a coordinate to launch missile: ").split())
62
63     col = coord_x
64     row = coord_y
65
66     if (row < 0) or (row > (size - 1)) or (col < 0) or (col > size - 1):
67         print("oops! That's not part of board")
68         continue
69     else:
70         # launch missile in the specified loc
71         board = launch_missile(board, row, col)
72         display_board(board)
73
74

```

Student 2





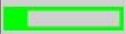
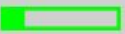


```

1 # Battleship game
2
3 from random import randint
4 # define a list for storing the board configuration
5 board = []
6 # function to create board
7 def create_board(size):
8     for x in range(size):
9         board.append(["-"] * size)
10
11 # function that places ship # in the random x,y coords
12 def place_ship():
13     x = random_row(size)
14     y = random_col(size)
15     board[x][y] = "X"
16
17 # function that displays board configuration
18 def display_board(brd):
19     for r in brd:
20         print(" ".join(r))
21
22 # function to generate random x-coord
23 def random_row(size):
24     return randint(0, size - 1)
25
26 # function to generate random y-coord
27 def random_col(size):
28     return randint(0, size - 1)
29
30 # function that places x if there is ship in specified loc.
31 # otherwise, it places 0
32 def launch_missile(board, row, col):
33     if board[row][col] == "X":
34         print("You hit a ship!")
35         board[row][col] = "X"
36     else:
37         print("You missed!")
38         board[row][col] = "0"
39     return board
40
41 print("Let's play Battleship!")
42 # prompt and accept board size
43 size = int(input("Enter board size: "))
44 create_board(size)
45 total_tiles = size * size
46 # number of ships must be less than one-fifth of number of titles
47 numShips = int((1/5)*total_tiles)
48 for i in range(numShips+1):
49     place_ship()
50     display_board(board)
51
52 # prompt and accept location of missile
53 for turn in range(size):
54     coord_x, coord_y = [int(i) for i in input("Pick a coordinate to launch missile: ").split()]
55
56     col = coord_x
57     row = coord_y
58     if((row<0) or (row>(size-1)) or (col<0) or (col>size-1)):
59         print("Sike! That's not part of the board")
60     else:
61         # launch missile in the specified loc
62         board = launch_missile(board,row,col)
63         display_board(board)
64
65

```

Student 1

Student 2

./moss_samples/sample01/student01_battleship.py (70%)		./moss_samples/sample01/student02_battleship.py (71%)	
38-60		27-47	
60-66		47-52	
24-37		11-19	

Student 1

```
def place_ship():
    x = random_row(size)
    y = random_col(size)
    board[x][y] = "X"

# function that displays board configuration
def display_board(brd):
    for r in brd:
        print(" ".join(r))

# function that places x if there is ship in specified loc,
# otherwise, it places 0
def launch_missile(board, row, col):
    if board[row][col] == "X":
        print("Boom! You hit a ship!")
        board[row][col] = "I"
    else:
        print("You missed! Try again.")
        board[row][col] = "0"
    return board

print("Let's play Battleship!")
# prompt and accept board size
size = int(input("Enter board size: "))
create_board(size)
total_tiles = size * size
# number of ships must be less than one-fifth of number of titles
numShips = int((1 / 5) * total_tiles)
for i in range(numShips + 1):
    place_ship()
display_board(board)

# prompt and accept location of missile
for turn in range(size * size):

    coord_x, coord_y = [int(i) for i in input("Pick a coordinate to launch missile: ").split()]

    col = coord_x
    row = coord_y

    if (row < 0) or (row > (size - 1)) or (col < 0) or (col > size - 1):
```

Student 2

```
def place_ship():
    x = random_row(size)
    y = random_col(size)
    board[x][y] = "X"
# function that displays board configuration
def display_board(brd):
    for r in brd:
        print(" ".join(r))
# function to generate random x coord

def launch_missile(board, row, col):
    if board[row][col] == "#":
        print("You hit a ship!")
        board[row][col] = "X"
    else:
        print("You missed!")
        board[row][col] = "0"
    return board
print("Let's play Battleship!")
# prompt and accept board size
size = int(input("Enter board size: "))
create_board(size)
total_tiles = size*size
# number of ships must be less than one-fifth of number of titles
numShips = int((1/5)*total_tiles)
for i in range(numShips+1):
    place_ship()
    display_board(board)

# prompt and accept location of missile
for turn in range(size):

    coord_x, coord_y = [int(i) for i in input("Pick a coordinate to launch missile: ").split()]

    col = coord_x
    row = coord_y
    if((row< 0) or (row>(size-1)) or (col<0) or (col>size-1)):
```

Student 3

```

1 # Battleship game
2
3 import random
4 import numpy as np
5 import os
6 import time
7
8 # Variable Definition
9 num_ships = 0
10 size = int(input("Enter a board size: "))
11 ocean = np.full((size,size),' ')
12
13 # Make the map
14 def makeMap_function(size, num_ships, ocean):
15     for x in range(0,size):
16         for y in range(0,size):
17             dice = random.randint(1,5)
18             if (dice == 1):
19                 if num_ships < (1/5 * size * size):
20                     ocean[x][y] = "▲"
21                     num_ships += 1
22                 else:
23                     ocean[x][y] = 'C'
24             else:
25                 ocean[x][y] = 'C'
26     print("There are", num_ships, "ships in the ocean.")
27     return num_ships
28
29 # Print the map
30 def print_array(arr):
31     os.system('clear')
32     for x in range(0,size):
33         for y in range(0,size):
34             print("\033[0;40;3m" + str(arr[y][x]),end=' ')
35         print()
36
37 # Shooting function
38 def shooting_function(num_ships):
39     while True:
40         coord_x = int(input("\033[0;34;3mPick an x coordinate: "))
41         coord_y = int(input("\033[0;34;3mPick a y coordinate: "))
42         if coord_x < 0 or coord_x > size - 1 or coord_y < 0 or coord_y > size - 1:
43             print("\033[0;34;3mNot a valid coordinate.")
44             continue
45         if ocean[coord_x][coord_y] == "▲":
46             ocean[coord_x][coord_y] = "X"
47             print_array(ocean)
48             print("\033[0;34;3mConfirmed hit!")
49             num_ships -= 1
50             if num_ships == 1:
51                 print(num_ships, "ship remaining")
52             else:
53                 print(num_ships, "ships remaining")
54         elif ocean[coord_x][coord_y] == "C":
55             ocean[coord_x][coord_y] = "O"
56             print_array(ocean)
57             print("\033[0;34;3mHow could you miss? The ships are right in front of you!")
58             if num_ships == 1:
59                 print(num_ships, "ship remaining")
60             else:
61                 print(num_ships, "ships remaining")
62         if num_ships == 0:
63             print("Congrats! You destroyed all enemy ships. You are our savior!")
64             exit()
65
66 # Main Code
67 num_ships = makeMap_function(size, num_ships, ocean)
68 print_array(ocean)
69 shooting_function(num_ships)
70

```

Student 4

```

1 import numpy as np
2 import random
3 import math
4
5 board_size = int(input('What would you like the size of your board to be?'))
6 board = np.full((board_size,board_size),'~')
7 total_slots = board_size * board_size
8 ship_slots = int(total_slots/5)
9 ships_per_row = ship_slots/board_size
10 ships_remaining = int(total_slots/5)
11 end_flag = 0
12 def ships(ship_slots,board_size,ships_per_row):
13     global board
14     for i in range(ship_slots):
15         x = random.randint(0,board_size - 1)
16         y = random.randint(0, board_size - 1)
17         board[x][y] = '#'
18
19 def missile_launch(ship_slots,total_slots):
20     global end_flag
21     global ships_remaining
22     global board
23     while (ships_remaining > 0):
24         x = int(input('What is the Y coordinate of your missile strike')) - 1
25         y = int(input('What is the X coordinate of your missile strike')) - 1
26         if board[x][y] == '#':
27             board[x][y] = 'X'
28             print('Direct Hit!!!')
29             ships_remaining -= 1
30         else:
31             board[x][y] = 'O'
32             print('You missed')
33         for n in range(board_size):
34             print()
35             for m in range(board_size):
36                 print(board[n][m],end='')
37         print()
38         print('Ships remaining', ships_remaining)
39
40
41 while True:
42     if ships_remaining > 0:
43         ships(ship_slots,board_size,ships_per_row)
44         end_flag = missile_launch (ship_slots,total_slots)
45     else:
46         break
47
48 print('Nice work sailor, you defeated all the enemy ships')
49

```

Student 5

```

1 import random
2
3 #function that will create a board in a list manner
4 def new_board(board_size):
5     return(['.' for i in range(board_size)] for i in range(board_size))
6
7 #function that will print the board without brackets
8 def display_board(board):
9     for i in board:
10         print(i)
11
12 #function that will create battleship and keep them hidden
13 def create_battleship(board_size):
14
15     #if board is 2 or smaller length of ship is 1
16     if board_size < 2:
17         ship_len = 1
18     #if board is 3 or smaller length of ship is 2
19     elif board_size < 4:
20         ship_len = 2
21     #if board is 4 or smaller, length of ship is either 2 or 3
22     elif board_size < 6:
23         ship_len = random.randint(2,3)
24     #if board is 6 or smaller, length of ship is either 2,3, or 4
25     elif board_size < 8:
26         ship_len = random.randint(2,4)
27     #if board greater than 8, length of ship is either 2,3,4 or 5
28     else:
29         ship_len = random.randint(2,5)
30
31     ship_pattern = random.randint(0, 1)
32
33     #if orientation is 0, make the battleship horizontal, else make it verticle
34     if ship_pattern == 0:
35         ship_row = [random.randint(0, board_size - 1)] * ship_len
36         cols = random.randint(0, board_size - ship_len)
37         ship_col = list(range(cols, cols + ship_len))
38         coordinates = tuple(zip(ship_row, ship_col))
39     else:
40         ship_col = [random.randint(0, board_size - 1)] * ship_len
41         row = random.randint(0, board_size - ship_len)
42         ship_row = list(range(row, row + ship_len))
43         coordinates = tuple(zip(ship_row, ship_col))
44
45     return list(coordinates)
46
47 def verify_coords(board_size):
48     temp = False
49     col, row = [int(i) for i in input("Pick a coordinate (x, y) to launch a missile (input space input): ").split()]
50
51     #loops all variable until the coordinates (x,y) are valid and can be on the board
52     while temp == False:
53
54         if row < 0 or row > board_size - 1:
55             row = int(input("Please (re)enter your row (y) value that is not greater or less than the board:\n"))
56             row = row + 1
57             temp = False
58         elif col < 0 or col > board_size - 1:
59             col = int(input("Please (re)enter your column (x) value that is not greater or less than the board:\n"))
60             col = col + 1
61             temp = False
62         else:
63             temp = True
64
65     return (row, col)
66
67 def update_board(given_coords, board, ship, coords):
68
69     if given_coords in coords:
70         print("You already made that given coords! Try again...")
71         return board
72     coords.append(given_coords)
73     board[given_coords[0]][given_coords[1]] = 'O'
74     if given_coords in ship:
75         print("You hit a battleship!")
76         board[given_coords[0]][given_coords[1]] = 'X'
77         ship.remove(given_coords)
78         return board
79     print("You miss! Try again...")
80     return board
81
82 #Print Victory and exit Program
83 def victory_point():
84     print("Congrats! You have sunk my battleship!")
85     exit()
86
87
88 #Main function (for full points, less than 10 pieces of code in main, [can be done in 8])
89 if __name__ == '__main__':
90     board_size = int(input("Enter a board size greater than 1: "))
91     board = new_board(board_size)
92     ships = create_battleship(board_size)
93     coords = []
94     display_board(board)
95     while (len(ships) > 0):
96         valid_coords = verify_coords(board_size)
97         board = update_board(valid_coords, board, ships, coords)
98         display_board(board)
99         victory_point()

```

Student 6





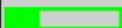
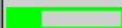
```

1 import random
2
3 #function that will create a board in a list manner
4 def create_board(grid_size):
5     return(['.' for count in range(grid_size)] for count in range(grid_size))
6
7 #function that will print the board without brackets
8 def print_board(board):
9     for i in board:
10         print(i)
11
12 #function that will create battleship and keep them hidden
13 def create_battleship(grid_size):
14
15     #if board is 2 or smaller length of ship is 1
16     if grid_size < 2:
17         battleship_length = 1
18     #if board is 4 or smaller length of ship is 2
19     elif grid_size < 4:
20         battleship_length = 2
21     #if board is 5 or smaller, length of ship is either 2 or 3
22     elif grid_size < 6:
23         battleship_length = random.randint(2,3)
24     #if board is 6 or smaller, length of ship is either 2,3, or 4
25     elif grid_size < 8:
26         battleship_length = random.randint(2,4)
27     #if board greater than 8, length of ship is either 2,3,4 or 5
28     else:
29         battleship_length = random.randint(2,5)
30
31     battleship_orientation = random.randint(0, 1)
32
33     #if orientation is 0, make the battleship horizontal, else make it verticle
34     if battleship_orientation == 0:
35         battleship_row = [random.randint(0, grid_size - 1)] * battleship_length
36         cols = random.randint(0, grid_size - battleship_length)
37         battleship_col = list(range(cols, cols + battleship_length))
38         coordinates = tuple(zip(battleship_row, battleship_col))
39     else:
40         battleship_col = [random.randint(0, grid_size - 1)] * battleship_length
41         row = random.randint(0, grid_size - battleship_length)
42         battleship_row = list(range(row, row + battleship_length))
43         coordinates = tuple(zip(battleship_row, battleship_col))
44
45     return list(coordinates)
46
47 def user_guess(grid_size):
48     valid = 'false'
49     print("====Here is what that there is no 0 index in this program====")
50
51     col, row = [int(i) for i in input("Pick a coordinate (x, y) to launch a missile (input 'space' input): ").split()]
52
53     #removes 0 index
54     row = row + 1
55     col = col + 1
56
57     #loops all variable until the coordinates (x,y) are valid and can be on the board
58     while valid == 'false':
59
60         if row < 0 or row > grid_size - 1:
61             row = int(input("Please (re)enter your row (y) value that is not greater or less than the board:\n"))
62             row = row + 1
63             valid = 'false'
64         elif col < 0 or col > grid_size - 1:
65             col = int(input("Please (re)enter your column (x) value that is not greater or less than the board:\n"))
66             col = col + 1
67             valid = 'false'
68         else:
69             valid = "true"
70
71     return (row, col)
72
73 def board_update(guess, board, ship, guesses):
74
75     if guess in guesses:
76         print("You already made that guess! Try again...")
77         return board
78     guesses.append(guess)
79     board[guess[0]][guess[1]] = 'O'
80     if guess in ship:
81         print("You hit a battleship!")
82         board[guess[0]][guess[1]] = 'X'
83         ship.remove(guess)
84         return board
85     print("You miss! Try again...")
86     return board
87
88 #Print Victory and exit Program
89 def win():
90     print("Congrats! You have sunk my battleship!")
91     exit()
92
93
94 #Main function (for full points, less than 10 pieces of code in main, [can be done in 8])
95 if __name__ == '__main__':
96     board_size = int(input("Enter a board size greater than 1: "))
97     board = create_board(board_size)
98     ships = create_battleship(board_size)
99     guesses = []
100     print_board(board)
101     while (len(ship) > 0):
102         attempt_guess = user_guess(board_size)
103         board = board_update(attempt_guess, board, ship, guesses)
104         print_board(board)
105         win()

```

Student 5

Student 6

./moss_samples/sample03/student05_battleship.py (78%)		./moss_samples/sample03/student06_battleship.py (76%)	
1-48		2-49	
65-97		72-104	


```
import random
```

```
#Function that will create a board in a list manner
def new_board(board_size):
    return[['.' for i in range(board_size)] for i in range(board_size)]
```

```
#Function that will print the board without brackets
def display_board(board):
    for i in board:
        print(*i)
```

```
#Function that will create battleship and keep them hidden
def create_battleship(board_size):
```

```
    #If board is 2 or smaller legnth of ship is 1
    if board_size < 2:
        ship_len = 1
    #If board is 4 or smaller legnth of ship is 2
    elif board_size < 4:
        ship_len = 2
    #If board is 6 or smaller, legnth of ship is either 2 or 3
    elif board_size < 6:
        ship_len = random.randint(2,3)
    #If board is 8 or smaller, legnth of ship is either 2,3, or 4
    elif board_size < 8:
        ship_len = random.randint(2,4)
    #If board greater than 9, legnth of ship is either 2,3,4 or 5
    else:
        ship_len = random.randint(2,5)
```

```
    ship_pattern = random.randint(0, 1)
```

```
    #If orientation is 0, make the battleship horizontal, else make it verticle
    if ship_pattern == 0:
        ship_row = [random.randint(0, board_size - 1)] * ship_len
        cols = random.randint(0, board_size - ship_len)
        ship_col = list(range(cols, cols + ship_len))
        coordinates = tuple(zip(ship_row, ship_col))
    else:
        ship_col = [random.randint(0, board_size - 1)] * ship_len
        row = random.randint(0, board_size - ship_len)
        ship_row = list(range(row, row + ship_len))
        coordinates = tuple(zip(ship_row, ship_col))
```

```
    return list(coordinates)
```

```
def verify_coords(board_size):
    temp = False
```

Student 5

```
import random
```

```
#Function that will create a board in a list manner
def create_board(grid_size):
    return[['.' for count in range(grid_size)] for count in range(grid_size)]
```

```
#Function that will print the board without brackets
def print_board(board):
    for b in board:
        print(*b)
```

```
#Function that will create battleship and keep them hidden
def create_battleship(grid_size):
```

```
    #If board is 2 or smaller legnth of ship is 1
    if grid_size < 2:
        battleship_length = 1
    #If board is 4 or smaller legnth of ship is 2
    elif grid_size < 4:
        battleship_length = 2
    #If board is 6 or smaller, legnth of ship is either 2 or 3
    elif grid_size < 6:
        battleship_length = random.randint(2,3)
    #If board is 8 or smaller, legnth of ship is either 2,3, or 4
    elif grid_size < 8:
        battleship_length = random.randint(2,4)
    #If board greater than 9, legnth of ship is either 2,3,4 or 5
    else:
        battleship_length = random.randint(2,5)
```

```
    battleship_orientation = random.randint(0, 1)
```

```
    #If orientation is 0, make the battleship horizontal, else make it verticle
    if battleship_orientation == 0:
        battleship_row = [random.randint(0, grid_size - 1)] * battleship_length
        cols = random.randint(0, grid_size - battleship_length)
        battleship_col = list(range(cols, cols + battleship_length))
        coordinates = tuple(zip(battleship_row, battleship_col))
    else:
        battleship_col = [random.randint(0, grid_size - 1)] * battleship_length
        row = random.randint(0, grid_size - battleship_length)
        battleship_row = list(range(row, row + battleship_length))
        coordinates = tuple(zip(battleship_row, battleship_col))
```

```
    return list(coordinates)
```

```
def user_guess(grid_size):
    valid = 'False'
```

Student 6

Student 5

```
    return(row, col)

def update_board(given_coords, board, ship, coords):

    if given_coords in coords:
        print("You already made that given_coords! Try again...")
        return board
    coords.append(given_coords)
    board[given_coords[0]] [given_coords[1]] = 'O'
    if given_coords in ship:
        print("You hit a battleship!")
        board[given_coords[0]] [given_coords[1]] = 'X'
        ship.remove(given_coords)
        return board
    print("You miss! Try again...")
    return board

#Print Victory and exit Program
def victory_point():
    print("Congrats! You have sunk my battleship!")
    exit()

#Main function (For full points, less than 10 pieces of code in main, [can be done in 6])
if __name__ == '__main__':
    board_size = int(input("Enter a board size greater than 1: "))
    board = new_board(board_size)
    ships = create_battleship(board_size)
    coords = []
    display_board(board)
    while(len(ships) > 0):
        valid_coords = verify_coords(board_size)
        board = update_board(valid_coords, board, ships, coords)
```

Student 6

```
    return(row, col)

def board_update(guess, board, ship, guesses):

    if guess in guesses:
        print("You already made that guess! Try again...")
        return board
    guesses.append(guess)
    board[guess[0]] [guess[1]] = 'O'
    if guess in ship:
        print("You hit a battleship!")
        board[guess[0]] [guess[1]] = 'X'
        ship.remove(guess)
        return board
    print("You miss! Try again...")
    return board

#Print Victory and exit Program
def win():
    print("Congrats! You have sunk my battleship!")
    exit()

#Main function (For full points, less than 10 pieces of code in main, [can be done in 6])
if __name__ == '__main__':
    board_area = int(input("Enter a board size greater than 1: "))
    board = create_board(board_area)
    ship = create_battleship(board_area)
    guesses = []
    print_board(board)
    while(len(ship) > 0):
        attempt_guess = user_guess(board_area)
        board = board_update(attempt_guess, board, ship, guesses)
```

Thank you for listening

Questions?