Project 18 - PLAYING A BETTER GAME OF BATTLESHIP BY USING MATHEMATICS

Introduction: Many who have played the game of *Battleship* will say it is a game of luck. Different players have different strategies for placing their ships, but targets are usually chosen at random. In this project, you will learn a technique in the game of *Battleship* that will give you an edge over your opponent.

Procedure:
1. You must obtain the game of *Battleship*. If you do not already own this game, perhaps you could borrow it from someone who does own it. If you are not familiar with the rules of *Battleship*, read over the rules given with the game.

2. Find another person who can participate in this experiment with you. They must not know the "mathematical" method that you will use. Note: If you have a computer version of the game, you can play against the computer.

3. You will use the "mathematical" method which is described here. Shown below is a representation of the game board used in the game, *Battleship*, where all positions are labeled with O or X symbols. To use this method, only choose targets which lie on positions labeled with X. Also, If you get a "hit", first choose targets which are two units away because these targets will be locations which correspond to positions labeled with the X symbol. Only choose targets which do not lie on positions labeled X to sink a ship that has been located.

|	1	2	3	4	5	6	7	8	9	10
A	X	O	X	O	X	O	X	O	X	O
B	O	X	O	X	O	X	O	X	O	X
C	X	O	X	O	X	O	X	O	X	O
D	O	X	O	X	O	X	O	X	O	X
E	X	O	X	O	X	O	X	O	X	O
F	O	X	O	X	O	X	O	X	O	X
G	X	O	X	O	X	O	X	O	X	O
H	O	X	O	X	O	X	O	X	O	X
I	X	O	X	O	X	O	X	O	X	O
J	O	X	O	X	O	X	O	X	O	X

Example: You select C3 and it is a hit. Your next selection is C1 and it is not a hit. Your next selection is A3 and it is a hit. At this point you know that there is probably a ship which covers the targets A3, B3, and C3 so you then select the target B3 for the purpose of sinking the ship.

	1	2	3	4	5	6	7	8	9	10
A	X	O	X	O	X	O	X	O	X	O
B	O	X	O	X	O	X	O	X	O	X
C	X	O	X	O	X	O	X	O	X	O
D	O	X	O	X	O	X	O	X	O	X
E	X	O	X	O	X	O	X	O	X	O
F	O	X	O	X	O	X	O	X	O	X
G	X	O	X	O	X	O	X	O	X	O
H	O	X	O	X	O	X	O	X	O	X
I	X	O	X	O	X	O	X	O	X	O
J	O	X	O	X	O	X	O	X	O	X

4. When you set your ships up, randomly scatter your ships. Do not clump them together. Your opponent can set up, and play in any manner they wish, but do not describe your method to your opponent. You should play eight games with your opponent, and record how many times you have won.

NUMBER OF WINS_____

NUMBER OF LOSSES_____
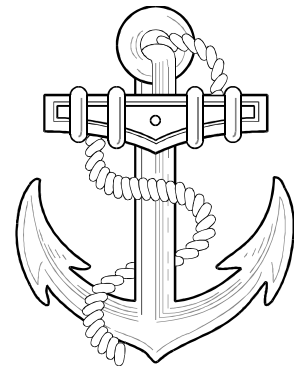
5.   Describe why using the "mathematical" method gives you an edge over your opponent?

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6.   What is the maximum number of "shots" you would have to take to locate every one of your opponents ships? Explain why your opponent cannot locate all of your ships with that same number of "shots".

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7. In this experiment, you spaced your ships apart. Write down a method of ship spacing which would allow your opponent to win easily. Describe why this method would allow your opponent to more easily defeat you.

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8. Is there a method of placing your ships that would work better than spacing them apart? If so, describe it.

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9. If you were playing a game of *Battleship* where only the two largest ships were used, devise an "improved method" for this game, and explain why it would give you an advantage over your opponent.

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