**SFWRENG 2MP3 – Programming for Mechatronics Fall 2018**

**Note: For each question, paste your code and also the screenshot of compilation & execution steps.**

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| **Exercise 1 Solution** | **Submitted By: HARNEET SINGH #400110275, singhh76@mcmaster.ca** |
| **Question #** | **Answer** |
| **Entire Code** | **#include <stdio.h>**  **#include <stdlib.h>**  **void FirstShipCoordinates();**  **void SecondShipCoordinates();**  **void ThirdShipCoordinates();**  **int turn = 1;**  **void main (){**  **puts("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*");**  **puts("\nThis program enables users to play a game of battleship on 10x10 boards:\n");**  **puts("Both players will get a chance to input the coordinates for their ships");**  **puts("on the following board: \n");**  **int board\_1[10][10] = {0};**  **int board\_2[10][10] = {0};**  **for (int i = 0; i < 10; i++){**  **for (int j = 0; j < 10; j++){**  **if (i == 0 && j == 0){**  **printf(" ");**  **for (int num = 0; num < 10; num++){**  **printf("%4d", num);**  **}**  **printf("\n");**  **}**  **if (i == 0 && j ==0) {printf("%4d", board\_1[i][j]);}**  **if (i != 0 && j == 0){**  **printf("%4d", i);**  **}**  **printf("%4d", board\_1[i][j]);**  **}**  **printf("\n");**  **}**  **puts ("\nFirst player should get ready to place their ships on the board:");**  **FirstShipCoordinates(board\_1);**    **SecondShipCoordinates(board\_1);**    **ThirdShipCoordinates(board\_1);**  **for (int i = 0; i < 10; i++){**  **for (int j = 0; j < 10; j++){**  **if (i == 0 && j == 0){**  **printf(" ");**  **for (int num = 0; num < 10; num++){**  **printf("%4d", num);**  **}**  **printf("\n");**  **}**  **if (i == 0 && j ==0) {printf("%4d", board\_1[i][j]);}**  **if (i != 0 && j == 0){**  **printf("%4d", i);**  **}**  **printf("%4d", board\_1[i][j]);**  **}**  **printf("\n");**  **}**  **puts("In the above-shown grid, '7' marks the locations of your ships");**  **puts("Before following the next command, please verify the locations of your ships");**  **char ch;**  **LOOP: printf("Press 'Y' or 'y' to clear the screen: ");**  **scanf(" %c", &ch);**  **if (ch == 'Y' || ch == 'y'){**  **system("clear");**  **}**  **else {goto LOOP;}**  **FirstShipCoordinates(board\_2);**    **SecondShipCoordinates(board\_2);**    **ThirdShipCoordinates(board\_2);**  **for (int i = 0; i < 10; i++){**  **for (int j = 0; j < 10; j++){**  **if (i == 0 && j == 0){**  **printf(" ");**  **for (int num = 0; num < 10; num++){**  **printf("%4d", num);**  **}**  **printf("\n");**  **}**  **if (i == 0 && j ==0) {printf("%4d", board\_2[i][j]);}**  **if (i != 0 && j == 0){**  **printf("%4d", i);**  **}**  **printf("%4d", board\_2[i][j]);**  **}**  **printf("\n");**  **}**  **puts("In the above-shown grid, '7' marks the locations of your ships");**  **puts("Before following the next command, please verify the locations of your ships");**  **char ch2;**  **LOOP2: printf("Press 'Y' or 'y' to clear the screen: ");**  **scanf(" %c", &ch2);**  **if (ch2 == 'Y' || ch2 == 'y'){**  **system("clear");**  **}**  **else {goto LOOP2;}**  **printf("Now, the guessing game starts:\n");**  **int hitCountPlayer1 = 0;**  **int hitCountPlayer2 = 0;**  **int guessingBoard\_1[10][10] = {{0}};**  **int guessingBoard\_2[10][10] = {{0}};**  **while ((hitCountPlayer1 < 12) && (hitCountPlayer2 < 12)){**  **int guess\_depth = 10, guess\_width = 10;**  **int guess\_depth2 = 10, guess\_width2 = 10;**  **OverlapCheckConfirmed:;**  **puts("PLAYER 1, enter your guessing coordinate:");**  **printf("Please enter the depth/vertical location of your opponents' ship (0-9): ");**  **scanf("%d", &guess\_depth);**  **printf("Please enter the width/horizontal location of your opponents' ship (0-9): ");**  **scanf("%d", &guess\_width);**  **if (guessingBoard\_2[guess\_depth][guess\_width] == 1 || guessingBoard\_2[guess\_depth][guess\_width] == 4){**  **puts("Already used these coordinates, please try again...");**  **goto OverlapCheckConfirmed;**  **}**  **else{**  **if (board\_2[guess\_depth][guess\_width] == 7){**  **hitCountPlayer1 += 1;**  **puts(":)You have just hit the opponents ship ('1' denotes the correctly guessed location)");**  **guessingBoard\_2[guess\_depth][guess\_width] = 1;**  **for (int a = 0; a < 10; a++){**  **for (int b = 0; b < 10; b++){**  **if (a == 0 && b == 0){**  **printf(" ");**  **for (int num1 = 0; num1 < 10; num1++){**  **printf("%4d", num1);**  **}**  **printf("\n");**  **}**  **if (a == 0 && b ==0) {printf("%4d", a);}**  **if (a != 0 && b == 0){**  **printf("%4d", a);**  **}**  **printf("%4d", guessingBoard\_2[a][b]);**  **}**  **printf("\n");**  **}**  **}**  **else {**  **puts("Too bad, your guess was wrong, please hand over the control to the other player now...");**  **puts("'4' denotes the failed attempt to detect the ships' location");**  **guessingBoard\_2[guess\_depth][guess\_width] = 4;**  **for (int a = 0; a < 10; a++){**  **for (int b = 0; b < 10; b++){**  **if (a == 0 && b == 0){**  **printf(" ");**  **for (int num1 = 0; num1 < 10; num1++){**  **printf("%4d", num1);**  **}**  **printf("\n");**  **}**  **if (a == 0 && b ==0) {printf("%4d", a);}**  **if (a != 0 && b == 0){**  **printf("%4d", a);**  **}**  **printf("%4d", guessingBoard\_2[a][b]);**  **}**  **printf("\n");**  **}**  **}**  **}**  **puts("\nPlease hand over the keyboard to PLAYER 2");**  **OverlapCheckConfirmed2:;**  **printf("Please enter the depth/vertical location of your opponents' ship (0-9): ");**  **scanf("%d", &guess\_depth2);**  **printf("Please enter the width/horizontal location of your opponents' ship (0-9): ");**  **scanf("%d", &guess\_width2);**  **if (guessingBoard\_1[guess\_depth2][guess\_width2] == 1 || guessingBoard\_1[guess\_depth2][guess\_width2] == 4){**  **puts("Already used these coordinates, please try again...");**  **goto OverlapCheckConfirmed2;**  **}**  **else{**  **if (board\_1[guess\_depth2][guess\_width2] == 7){**  **hitCountPlayer2 += 1;**  **puts("\n:)You have just hit the opponents ship ('1' denotes the correctly guessed location)");**  **guessingBoard\_1[guess\_depth2][guess\_width2] = 1;**  **for (int a = 0; a < 10; a++){**  **for (int b = 0; b < 10; b++){**  **if (a == 0 && b == 0){**  **printf(" ");**  **for (int num1 = 0; num1 < 10; num1++){**  **printf("%4d", num1);**  **}**  **printf("\n");**  **}**  **if (a == 0 && b ==0) {printf("%4d", a);}**  **if (a != 0 && b == 0){**  **printf("%4d", a);**  **}**  **printf("%4d", guessingBoard\_1[a][b]);**  **}**  **printf("\n");**  **}**  **}**    **else {**  **puts("\nToo bad, your guess was wrong, please hand over the control to the other player now...");**  **puts("'4' denotes the failed attempt to detect the ships' location");**  **guessingBoard\_1[guess\_depth2][guess\_width2] = 4;**  **for (int a = 0; a < 10; a++){**  **for (int b = 0; b < 10; b++){**  **if (a == 0 && b == 0){**  **printf(" ");**  **for (int num1 = 0; num1 < 10; num1++){**  **printf("%4d", num1);**  **}**  **printf("\n");**  **}**  **if (a == 0 && b ==0) {printf("%4d", a);}**  **if (a != 0 && b == 0){**  **printf("%4d", a);**  **}**  **printf("%4d", guessingBoard\_1[a][b]);**  **}**  **printf("\n");**  **}**  **}**  **}**  **}**  **if (hitCountPlayer1 == 12) {puts("\n!!!!!!!!Congrats, Player 1 have won the game!!!!!!!!");}**  **else {puts("\n!!!!!!!!Congrats, Player 2 have won the game!!!!!!!!");}**  **}**  **void FirstShipCoordinates(int shipOne[10][10]){**  **printf("\n\*\*\*\*Now, the display screen must be facing Player #%d only\*\*\*\*\n", turn);**  **puts("\*\*\*\*Dimensions of the first ship are 1 X 5\*\*\*\*\n");**  **depthWidthloop:;**  **int depth = 10, width = 10;**  **while ((depth < 0 || depth > 9) && (width < 0 || width > 9)) {**  **printf("Please enter the depth/vertical location of the first ship (0-9): ");**  **scanf("%d", &depth);**  **printf("Please enter the width/horizontal location of the first ship (0-9): ");**  **scanf("%d", &width);**  **}**  **printf("\nPlease select one of the following options (The ship will\n");**  **printf("be oriented accordingly):\n1.(Vertical)\t ");**  **int d = depth;**  **int w = width;**  **unsigned int depth\_limit = depth + 5;**  **unsigned int width\_limit = width + 5;**    **for (d; d < depth\_limit; d++){**  **printf("%d,%d; ", d, width);**  **}**  **printf("\n2.(Horizontal)\t ");**  **for (w; w < width\_limit; w++){**  **printf("%d,%d; ", depth, w);**  **} printf("\n");**  **if (depth\_limit > 10 || width\_limit > 10) {**  **puts("!!!Your 1X5 ship will not fit at this location (grid limit is 0 to 9), please try again");**  **goto depthWidthloop;**  **}**  **int orientation;**  **loop1: printf("Please select one of the above-written options (1-Vertical or 2-Horizontal): ");**  **scanf("%d", &orientation);**  **if (orientation == 1){**  **for (int x = depth; x < (depth + 5); x++){**  **shipOne[x][width] = 7;**  **}**  **}**  **else if (orientation == 2){**  **for (int x = width; x < (width + 5); x++){**  **shipOne[depth][x] = 7;**  **}**  **}**  **else {**  **puts ("!!!Please select a valid input");**  **goto loop1;**  **}**  **turn += 1;**  **}**  **void SecondShipCoordinates (int shipTwo[10][10]){**  **puts("\n\*\*\*\*Dimensions of the second ship are 1 X 3\*\*\*\*\n");**  **int depth = 10, width = 10;**  **int countCheckVertical = 0, countCheckHorizontal = 0;**  **loop2: do {**  **depth = 10, width = 10;**  **while ((depth < 0 || depth > 9) && (width < 0 || width > 9)) {**  **printf("Please enter the depth/vertical location of the second ship (0-9): ");**  **scanf("%d", &depth);**  **printf("Please enter the width/horizontal location of the second ship (0-9): ");**  **scanf("%d", &width);**  **}**  **} while (shipTwo[depth][width] == 7);**  **printf("\nPlease select one of the following options (The ship will\n");**  **printf("be oriented accordingly):\n1.(Vertical)\t ");**  **int d = depth;**  **int w = width;**  **unsigned int depth\_limit = depth + 3;**  **unsigned int width\_limit = width + 3;**  **for (d; d < depth\_limit; d++){**  **printf("%d,%d; ", d, width);**  **if (shipTwo[d][width] == 7){**  **puts("\n!!!Vertical orientation not possible, because ship-one holds this place\n");**  **countCheckVertical += 1;**  **goto skipDueToOverlap;**  **}**  **}**  **skipDueToOverlap:;**  **printf("\n2.(Horizontal)\t ");**  **for (w; w < width\_limit; w++){**  **printf("%d,%d; ", depth, w);**  **if (shipTwo[depth][w] == 7){**  **puts("\n!!!Horizontal orientation not possible, because ship-one holds this place\n");**  **countCheckHorizontal += 1;**  **char answer;**  **printf("\nPlease enter 'Y' or 'y' to make a selection for vertical orientation");**  **printf("\nOR enter 'N' or 'n' to try new depth & width values: ");**  **scanf(" %c", &answer);**  **if (answer == 'N' || answer == 'n'){**  **goto loop2;}**  **}**  **}**  **if (depth\_limit > 10 || width\_limit > 10) {**  **puts("!!!Your 1X3 ship will not fit at this location (grid limit is 0 to 9), please try again");**  **goto loop2;**  **}**  **int orientation;**  **loop3: printf("\nPlease select one of the above-written options (1-Vertical or 2-Horizontal): ");**  **scanf("%d", &orientation);**  **if (orientation == 1){**  **if (countCheckVertical == 1) {goto loop2;}**  **for (int x = depth; x < (depth + 3); x++){**  **shipTwo[x][width] = 7;**  **}**  **}**  **else if (orientation == 2){**  **if (countCheckHorizontal == 1) {goto loop2;}**  **for (int x = width; x < (width + 3); x++){**  **shipTwo[depth][x] = 7;**  **}**  **}**  **else {**  **puts ("!!!Please select a valid input");**  **goto loop3;**  **}**  **}**  **void ThirdShipCoordinates (int shipThree[10][10]){**  **puts("\n\*\*\*\*Dimensions of the third ship are 1 X 4\*\*\*\*\n");**  **int depth = 10, width = 10;**  **int countCheckHorizontal = 0, countCheckVertical = 0;**  **loop4: do {**  **depth = 10, width = 10;**    **while ((depth < 0 || depth > 9) && (width < 0 || width > 9)) {**  **printf("Please enter the depth/vertical location of the third ship (0-9): ");**  **scanf("%d", &depth);**  **printf("Please enter the width/horizontal location of the third ship (0-9): ");**  **scanf("%d", &width);**  **}**  **} while (shipThree[depth][width] == 7);**  **printf("\nPlease select one of the following options (The ship will\n");**  **printf("be oriented accordingly):\n1.(Vertical)\t ");**  **int d = depth;**  **int w = width;**  **unsigned int depth\_limit = depth + 4;**  **unsigned int width\_limit = width + 4;**  **for (d; d < depth\_limit; d++){**  **printf("%d,%d; ", d, width);**  **if (shipThree[d][width] == 7){**  **puts("\n!!!Please try a new coordinate value, because ship-one/two holds this place\n");**  **goto loop4;**  **}**  **}**  **printf("\n2.(Horizontal)\t ");**  **for (w; w < width\_limit; w++){**  **printf("%d,%d; ", depth, w);**  **if (shipThree[depth][w] == 7){**  **puts("\n!!!Please try a new coordinate value, because ship-one/two holds this place\n");**  **goto loop4;**  **}**  **} printf("\n");**  **if (depth\_limit > 10 || width\_limit > 10) {**  **puts("!!!Your 1X4 ship will not fit at this location (grid limit is 0 to 9), please try again");**  **goto loop4;**  **}**  **int orientation;**  **loop5:;**  **printf("Please select one of the above-written options (1-Vertical or 2-Horizontal): ");**  **scanf("%d", &orientation);**  **if (orientation == 1){**  **for (int x = depth; x < (depth + 4); x++){**  **shipThree[x][width] = 7;**  **}**  **}**  **else if (orientation == 2){**  **for (int x = width; x < (width + 4); x++){**  **shipThree[depth][x] = 7;**  **}**  **}**  **else{**  **puts ("!!!Please select a valid input");**  **goto loop5;**  **}**  **}** |
| **#1-a** | **#include <stdio.h>**  **#include <stdlib.h>**  **void FirstShipCoordinates();**  **void SecondShipCoordinates();**  **void ThirdShipCoordinates();**  **int turn = 1;**  **void main (){**  **puts("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*");**  **puts("\nThis program enables users to play a game of battleship on 10x10 boards:\n");**  **puts("Both players will get a chance to input the coordinates for their ships");**  **puts("on the following board: \n");**  **int board\_1[10][10] = {0};**  **int board\_2[10][10] = {0};**  **for (int i = 0; i < 10; i++){**  **for (int j = 0; j < 10; j++){**  **if (i == 0 && j == 0){**  **printf(" ");**  **for (int num = 0; num < 10; num++){**  **printf("%4d", num);**  **}**  **printf("\n");**  **}**  **if (i == 0 && j ==0) {printf("%4d", board\_1[i][j]);}**  **if (i != 0 && j == 0){**  **printf("%4d", i);**  **}**  **printf("%4d", board\_1[i][j]);**  **}**  **printf("\n");**  **}**  **puts ("\nFirst player should get ready to place their ships on the board:");**  **FirstShipCoordinates(board\_1);**    **SecondShipCoordinates(board\_1);**    **ThirdShipCoordinates(board\_1);**  **for (int i = 0; i < 10; i++){**  **for (int j = 0; j < 10; j++){**  **if (i == 0 && j == 0){**  **printf(" ");**  **for (int num = 0; num < 10; num++){**  **printf("%4d", num);**  **}**  **printf("\n");**  **}**  **if (i == 0 && j ==0) {printf("%4d", board\_1[i][j]);}**  **if (i != 0 && j == 0){**  **printf("%4d", i);**  **}**  **printf("%4d", board\_1[i][j]);**  **}**  **printf("\n");**  **}**  **puts("In the above-shown grid, '7' marks the locations of your ships");**  **puts("Before following the next command, please verify the locations of your ships");**  **char ch;**  **LOOP: printf("Press 'Y' or 'y' to clear the screen: ");**  **scanf(" %c", &ch);**  **if (ch == 'Y' || ch == 'y'){**  **system("clear");**  **}**  **else {goto LOOP;}**  **FirstShipCoordinates(board\_2);**    **SecondShipCoordinates(board\_2);**    **ThirdShipCoordinates(board\_2);**  **for (int i = 0; i < 10; i++){**  **for (int j = 0; j < 10; j++){**  **if (i == 0 && j == 0){**  **printf(" ");**  **for (int num = 0; num < 10; num++){**  **printf("%4d", num);**  **}**  **printf("\n");**  **}**  **if (i == 0 && j ==0) {printf("%4d", board\_2[i][j]);}**  **if (i != 0 && j == 0){**  **printf("%4d", i);**  **}**  **printf("%4d", board\_2[i][j]);**  **}**  **printf("\n");**  **}**  **puts("In the above-shown grid, '7' marks the locations of your ships");**  **puts("Before following the next command, please verify the locations of your ships");**  **char ch2;**  **LOOP2: printf("Press 'Y' or 'y' to clear the screen: ");**  **scanf(" %c", &ch2);**  **if (ch2 == 'Y' || ch2 == 'y'){**  **system("clear");**  **}**  **else {goto LOOP2;}**  **printf("Now, the guessing game starts:\n");**  **int hitCountPlayer1 = 0;**  **int hitCountPlayer2 = 0;**  **int guessingBoard\_1[10][10] = {{0}};**  **int guessingBoard\_2[10][10] = {{0}};**  **while ((hitCountPlayer1 < 12) && (hitCountPlayer2 < 12)){**  **int guess\_depth = 10, guess\_width = 10;**  **int guess\_depth2 = 10, guess\_width2 = 10;**  **OverlapCheckConfirmed:;**  **puts("PLAYER 1, enter your guessing coordinate:");**  **printf("Please enter the depth/vertical location of your opponents' ship (0-9): ");**  **scanf("%d", &guess\_depth);**  **printf("Please enter the width/horizontal location of your opponents' ship (0-9): ");**  **scanf("%d", &guess\_width);**  **if (guessingBoard\_2[guess\_depth][guess\_width] == 1 || guessingBoard\_2[guess\_depth][guess\_width] == 4){**  **puts("Already used these coordinates, please try again...");**  **goto OverlapCheckConfirmed;**  **}**  **else{**  **if (board\_2[guess\_depth][guess\_width] == 7){**  **hitCountPlayer1 += 1;**  **puts(":)You have just hit the opponents ship ('1' denotes the correctly guessed location)");**  **guessingBoard\_2[guess\_depth][guess\_width] = 1;**  **for (int a = 0; a < 10; a++){**  **for (int b = 0; b < 10; b++){**  **if (a == 0 && b == 0){**  **printf(" ");**  **for (int num1 = 0; num1 < 10; num1++){**  **printf("%4d", num1);**  **}**  **printf("\n");**  **}**  **if (a == 0 && b ==0) {printf("%4d", a);}**  **if (a != 0 && b == 0){**  **printf("%4d", a);**  **}**  **printf("%4d", guessingBoard\_2[a][b]);**  **}**  **printf("\n");**  **}**  **}**  **else {**  **puts("Too bad, your guess was wrong, please hand over the control to the other player now...");**  **puts("'4' denotes the failed attempt to detect the ships' location");**  **guessingBoard\_2[guess\_depth][guess\_width] = 4;**  **for (int a = 0; a < 10; a++){**  **for (int b = 0; b < 10; b++){**  **if (a == 0 && b == 0){**  **printf(" ");**  **for (int num1 = 0; num1 < 10; num1++){**  **printf("%4d", num1);**  **}**  **printf("\n");**  **}**  **if (a == 0 && b ==0) {printf("%4d", a);}**  **if (a != 0 && b == 0){**  **printf("%4d", a);**  **}**  **printf("%4d", guessingBoard\_2[a][b]);**  **}**  **printf("\n");**  **}**  **}**  **}**  **puts("\nPlease hand over the keyboard to PLAYER 2");**  **OverlapCheckConfirmed2:;**  **printf("Please enter the depth/vertical location of your opponents' ship (0-9): ");**  **scanf("%d", &guess\_depth2);**  **printf("Please enter the width/horizontal location of your opponents' ship (0-9): ");**  **scanf("%d", &guess\_width2);**  **if (guessingBoard\_1[guess\_depth2][guess\_width2] == 1 || guessingBoard\_1[guess\_depth2][guess\_width2] == 4){**  **puts("Already used these coordinates, please try again...");**  **goto OverlapCheckConfirmed2;**  **}**  **else{**  **if (board\_1[guess\_depth2][guess\_width2] == 7){**  **hitCountPlayer2 += 1;**  **puts("\n:)You have just hit the opponents ship ('1' denotes the correctly guessed location)");**  **guessingBoard\_1[guess\_depth2][guess\_width2] = 1;**  **for (int a = 0; a < 10; a++){**  **for (int b = 0; b < 10; b++){**  **if (a == 0 && b == 0){**  **printf(" ");**  **for (int num1 = 0; num1 < 10; num1++){**  **printf("%4d", num1);**  **}**  **printf("\n");**  **}**  **if (a == 0 && b ==0) {printf("%4d", a);}**  **if (a != 0 && b == 0){**  **printf("%4d", a);**  **}**  **printf("%4d", guessingBoard\_1[a][b]);**  **}**  **printf("\n");**  **}**  **}**    **else {**  **puts("\nToo bad, your guess was wrong, please hand over the control to the other player now...");**  **puts("'4' denotes the failed attempt to detect the ships' location");**  **guessingBoard\_1[guess\_depth2][guess\_width2] = 4;**  **for (int a = 0; a < 10; a++){**  **for (int b = 0; b < 10; b++){**  **if (a == 0 && b == 0){**  **printf(" ");**  **for (int num1 = 0; num1 < 10; num1++){**  **printf("%4d", num1);**  **}**  **printf("\n");**  **}**  **if (a == 0 && b ==0) {printf("%4d", a);}**  **if (a != 0 && b == 0){**  **printf("%4d", a);**  **}**  **printf("%4d", guessingBoard\_1[a][b]);**  **}**  **printf("\n");**  **}**  **}**  **}**  **}**  **if (hitCountPlayer1 == 12) {puts("\n!!!!!!!!Congrats, Player 1 have won the game!!!!!!!!");}**  **else {puts("\n!!!!!!!!Congrats, Player 2 have won the game!!!!!!!!");}**  **}** |
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| **#1-b** | **void FirstShipCoordinates(int shipOne[10][10]){**  **printf("\n\*\*\*\*Now, the display screen must be facing Player #%d only\*\*\*\*\n", turn);**  **puts("\*\*\*\*Dimensions of the first ship are 1 X 5\*\*\*\*\n");**  **depthWidthloop:;**  **int depth = 10, width = 10;**  **while ((depth < 0 || depth > 9) && (width < 0 || width > 9)) {**  **printf("Please enter the depth/vertical location of the first ship (0-9): ");**  **scanf("%d", &depth);**  **printf("Please enter the width/horizontal location of the first ship (0-9): ");**  **scanf("%d", &width);**  **}**  **printf("\nPlease select one of the following options (The ship will\n");**  **printf("be oriented accordingly):\n1.(Vertical)\t ");**  **int d = depth;**  **int w = width;**  **unsigned int depth\_limit = depth + 5;**  **unsigned int width\_limit = width + 5;**    **for (d; d < depth\_limit; d++){**  **printf("%d,%d; ", d, width);**  **}**  **printf("\n2.(Horizontal)\t ");**  **for (w; w < width\_limit; w++){**  **printf("%d,%d; ", depth, w);**  **} printf("\n");**  **if (depth\_limit > 10 || width\_limit > 10) {**  **puts("!!!Your 1X5 ship will not fit at this location (grid limit is 0 to 9), please try again");**  **goto depthWidthloop;**  **}**  **int orientation;**  **loop1: printf("Please select one of the above-written options (1-Vertical or 2-Horizontal): ");**  **scanf("%d", &orientation);**  **if (orientation == 1){**  **for (int x = depth; x < (depth + 5); x++){**  **shipOne[x][width] = 7;**  **}**  **}**  **else if (orientation == 2){**  **for (int x = width; x < (width + 5); x++){**  **shipOne[depth][x] = 7;**  **}**  **}**  **else {**  **puts ("!!!Please select a valid input");**  **goto loop1;**  **}**  **turn += 1;**  **}** |
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| **1-c** | **void SecondShipCoordinates (int shipTwo[10][10]){**  **puts("\n\*\*\*\*Dimensions of the second ship are 1 X 3\*\*\*\*\n");**  **int depth = 10, width = 10;**  **int countCheckVertical = 0, countCheckHorizontal = 0;**  **loop2: do {**  **depth = 10, width = 10;**  **while ((depth < 0 || depth > 9) && (width < 0 || width > 9)) {**  **printf("Please enter the depth/vertical location of the second ship (0-9): ");**  **scanf("%d", &depth);**  **printf("Please enter the width/horizontal location of the second ship (0-9): ");**  **scanf("%d", &width);**  **}**  **} while (shipTwo[depth][width] == 7);**  **printf("\nPlease select one of the following options (The ship will\n");**  **printf("be oriented accordingly):\n1.(Vertical)\t ");**  **int d = depth;**  **int w = width;**  **unsigned int depth\_limit = depth + 3;**  **unsigned int width\_limit = width + 3;**  **for (d; d < depth\_limit; d++){**  **printf("%d,%d; ", d, width);**  **if (shipTwo[d][width] == 7){**  **puts("\n!!!Vertical orientation not possible, because ship-one holds this place\n");**  **countCheckVertical += 1;**  **goto skipDueToOverlap;**  **}**  **}**  **skipDueToOverlap:;**  **printf("\n2.(Horizontal)\t ");**  **for (w; w < width\_limit; w++){**  **printf("%d,%d; ", depth, w);**  **if (shipTwo[depth][w] == 7){**  **puts("\n!!!Horizontal orientation not possible, because ship-one holds this place\n");**  **countCheckHorizontal += 1;**  **char answer;**  **printf("\nPlease enter 'Y' or 'y' to make a selection for vertical orientation");**  **printf("\nOR enter 'N' or 'n' to try new depth & width values: ");**  **scanf(" %c", &answer);**  **if (answer == 'N' || answer == 'n'){**  **goto loop2;}**  **}**  **}**  **if (depth\_limit > 10 || width\_limit > 10) {**  **puts("!!!Your 1X3 ship will not fit at this location (grid limit is 0 to 9), please try again");**  **goto loop2;**  **}**  **int orientation;**  **loop3: printf("\nPlease select one of the above-written options (1-Vertical or 2-Horizontal): ");**  **scanf("%d", &orientation);**  **if (orientation == 1){**  **if (countCheckVertical == 1) {goto loop2;}**  **for (int x = depth; x < (depth + 3); x++){**  **shipTwo[x][width] = 7;**  **}**  **}**  **else if (orientation == 2){**  **if (countCheckHorizontal == 1) {goto loop2;}**  **for (int x = width; x < (width + 3); x++){**  **shipTwo[depth][x] = 7;**  **}**  **}**  **else {**  **puts ("!!!Please select a valid input");**  **goto loop3;**  **}**  **}** |
|  |
| **1-d** | **void ThirdShipCoordinates (int shipThree[10][10]){**  **puts("\n\*\*\*\*Dimensions of the third ship are 1 X 4\*\*\*\*\n");**  **int depth = 10, width = 10;**  **int countCheckHorizontal = 0, countCheckVertical = 0;**  **loop4: do {**  **depth = 10, width = 10;**    **while ((depth < 0 || depth > 9) && (width < 0 || width > 9)) {**  **printf("Please enter the depth/vertical location of the third ship (0-9): ");**  **scanf("%d", &depth);**  **printf("Please enter the width/horizontal location of the third ship (0-9): ");**  **scanf("%d", &width);**  **}**  **} while (shipThree[depth][width] == 7);**  **printf("\nPlease select one of the following options (The ship will\n");**  **printf("be oriented accordingly):\n1.(Vertical)\t ");**  **int d = depth;**  **int w = width;**  **unsigned int depth\_limit = depth + 4;**  **unsigned int width\_limit = width + 4;**  **for (d; d < depth\_limit; d++){**  **printf("%d,%d; ", d, width);**  **if (shipThree[d][width] == 7){**  **puts("\n!!!Please try a new coordinate value, because ship-one/two holds this place\n");**  **goto loop4;**  **}**  **}**  **printf("\n2.(Horizontal)\t ");**  **for (w; w < width\_limit; w++){**  **printf("%d,%d; ", depth, w);**  **if (shipThree[depth][w] == 7){**  **puts("\n!!!Please try a new coordinate value, because ship-one/two holds this place\n");**  **goto loop4;**  **}**  **} printf("\n");**  **if (depth\_limit > 10 || width\_limit > 10) {**  **puts("!!!Your 1X4 ship will not fit at this location (grid limit is 0 to 9), please try again");**  **goto loop4;**  **}**  **int orientation;**  **loop5:;**  **printf("Please select one of the above-written options (1-Vertical or 2-Horizontal): ");**  **scanf("%d", &orientation);**  **if (orientation == 1){**  **for (int x = depth; x < (depth + 4); x++){**  **shipThree[x][width] = 7;**  **}**  **}**  **else if (orientation == 2){**  **for (int x = width; x < (width + 4); x++){**  **shipThree[depth][x] = 7;**  **}**  **}**  **else{**  **puts ("!!!Please select a valid input");**  **goto loop5;**  **}**  **}** |
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| **1-e** |  |
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| **1-f** |  |
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