```
1: #include<stdio.h>
  2: #include<time.h>
  3: #define size 10
   4: #define num_ship 5
                                                       ----- Project OF Class : SYIT/B -----
  6:
                                                       ----- Battelship Game Using Matrices ------ of DATA STRUCTURE in C
 10:
 11: ******* Group Members Details *******
                                                            ROLL no.
 13:
 14:
             1) Shivam Dubey
 15.
                                                             4175
             2) Aayush Yadav
3) Aqsa Shaikh
 17:
                                                             4135
 18.
 20:
                                           Data_type
 21:
               Name
                                                                                Details
 22.
                                                 Integer
                                                                          Creating the Variable for Selecting Main menu Option
 24:
                                             String
 25: player_name[9]
                                                                   The Variable for storing Players Name
          setting_op
                                             Integer
                                                                        Creating this variable for selecting the Option from setting menu
 28:
 29.
       ******* Fuction Details : *********
 31:
                                                                      Details of
 32:
                  Name
 33.
                                                    - This Function is Use To display the Section of About Us
 35:
 36: players_setting()
                                                     - This function is for players setting Option in Setting .....
          setting_tab()
                                                       - A Function for Setting option In Game
 39:
 40.
         heLp()
                                                       - a function for the Help and the FAQ's option
       42:
 43:
                    > printf(" ");
> scanf(" ";
 46:
 47:
 48:
49:
50:

1: int option; // for Selecting the operation to perform
52: void aboutus(); //Declaring the Function About us for About us option
53: char player_name[9]="Guest 001";// Creating the Variable for Players Name
54: void players_setting(); // Creating the Function for Setting Option
55: int setting_op; // Variable for selecting a option in settings
56: void setting_tab(); // creating a function for setting
57: void help(); // a function for the Help and the FAsqs option
58: void how_to_play(); // a function to display the How to play section
59: void delay(); //creating a Delay function to delay the Output
60: void play_hard();
61:
 50:
 61:
 62: char user_board[size][size]; // this matrix is for the user To place the ship At any position in matrix
 63: int i,j,k;
64: int num=0;
 65: int num2=0: //
 66: int counter=0; // this is counter variable
67: int put_ship;
 68: int put_ship_row; // Varibale for taking the index at which row You want to Place Ship
 69: int put_ship_column;// Varibale for taking the indexat which column You want to Place Ship
70: int computer_board[size][size]; // this Is a matrix for the Computer To Place The Ship According to Him
71: int getRandomNumber( min, max) // creating The Function Which will give the Random Number According to Him
 72: {
 73.
             return min + rand() % (max - min + 1);
 75: int ctarget_row; // temporary varibale for computer targetting row
75: int ctarget_row; // temporary varibale for computer targetting row
76: int ctarget_column; // temporary varibale for computer targetting column
77: int utarget_row; // temporary varibale for user targetting row
78: int utarget_column; // temporary varibale for user targetting column
79: int put_random_row; // for Getting the Random row value
80: int put_random_column; // for Getting the Random Column value
81: void delay(); //creating a Delay function to delay the Output
82: void target_computer(); // user will Target the Computer and CHeck For The Ship at Given index by user
83: void target_user(); // computer will Target the user and CHeck For The Ship at Given index by user
84: int player_hits = 0; // Creating the variable to get the couter for the no f hits of player
85: int computer_hits = 0; // Creating the variable to get the couter for the no of hits of computer
86: void display_user_board(); // creating the function for Displaying the Users board
87:
 87:
 88.
       int main()
 90: {
 91:
 92: while(1)
 93: {
               printf("\n");
 94:
             95.
 98:
 99.
101:
102:
103
105:
106
107:
108:
```

```
printf("\t\t\t\t\t\t >>>> Enter Your Choice Here ..... ");
110:
         scanf("%d",&option);
printf("\n\n\n\n");
111:
112.
     switch(option)
113: {
114:
         case 1:
              delay(1);
printf("\n\t\t\t\t\t
delay(1);
printf("\t\t\t\t
115
                                             You had Selected How to Play? Option \n\n");
117:
                                               Wait we are Processing .....\n\n"):
118:
119
              delay(1);
printf("\t\t\t\t\t\t
                                               Wait we are processing....\n\n");
121:
              delay(1);
printf("\t\t\t\t\t\t\t
122:
                                           Be patient while we are Processing ..... \n\n\n\n\n\n\n\n\n\n\n\n");
123
              play_hard();
break;
124:
125:
126
         case 2:
              delay(1);
printf("\n\t\t\t\t\t\t
127:
                                                You had Selected How to Play? Option \n");
128:
             129:
130
                                                Wait we are Processing .....");
                                                Be patient while we are Processing ..... ");
132:
133:
134
135:
136:
137
         case 3:
              delay(1);
printf("\n\t\t\t\t\t\t
                                                You had Selected About Option \n\n");
139:
             140:
                                                Wait we are Processing .....");
141 .
                                                  Be patient while we are Processing ..... ");
143:
144:
145:
146:
147:
148
         case 4.
              delay(1);
printf("\n\t\t\t\t\t\t
149:
                                                You had Selected Help & FAQ's Option \n\n");
150:
             151:
                                                Wait we are Processing .....");
152
                                                     Be patient while we are Processing ..... ");
154:
155:
156
158:
159
          case 5:
              delay(1);
printf("\n\t\t\t\t\t\t
160:
                                                You had Selected Setting Option \n\n");
161:
             162:
163
                                                Wait we are Processing .....");
                                                  Be patient while we are Processing ..... ");
165:
166:
167
              break:
169:
170
         case 6
             e 6:
    delay(1);
    printf("\n\n");
    printf("add the ending statement comming soon ");
    //Calling the About us functionx
172:
173:
174:
176:
177:
         default :
178
              delay(1);
printf("\n\t\t\t\t\t\t
                                                   Be patient while we are Processing ..... ");
              delay(1);
printf("\n\t\t\t\t
delay(1);
printf("\n\t\t\t\t\t
180:
                                                   Invalid Input .... ");
181 -
                                                       Try Again ");
183:
184:
185
187: }
188:
189:
190: }
         return 0;
191:
192.
193: // Now creatin the Function of About us
194: void aboutus()
195:
              delay(1);
printf("\n\n\n
196
198:
              delay(1);
              printf("\t\t\t\t\t\t\t-----\n\n");
199:
             200.
201:
202:
203.
205:
                                  3. HARD Mode \n"):
206:
              printf("\t\t\t
              printf("\n\t\t\tsy using the Multiple Options You Can Play As You Wants So that You have Enjoy Well While playing The Games \n");
printf("\t\t\tYou can Also acess to RULES AND REGULARTIONS section where You can Find the List a Rules For Playing Games\n");
printf("\t\t\tYou Can Start Plying By Just Selecting the Option On Screen ......\n\n ");
207.
209:
210:
211:
212:
              213:
214
             // frist paragraph
printf("\n\t\t\tBattleship is a turn-based 2-player game.Each player has a 10x10 \n\t\t\tgrid where the ships are placed randomly.\n");
printf("\t\tEach player fires in the \n\t\t\tadverse grid and tries to sink their enemy's fleet in turns.\n");
```

```
217:
                         delay(1);
                         delay(1);
// Second paragraph
printf("\n\t\t\tBattleship (also known as Battleships or Sea Battle[1]) is a strategy type guessing game for two players.\n");
printf("\n\t\t\tIt is played on ruled grids (paper or board) on which each player's fleet of warships aremarked. \n");
printf("\t\t\tIt boations of the fleets are concealed from the other player. Players alternate turns calling \n");
printf("\t\t\tshots at the other player's ships, and the objective of the game is to destroy the opposing player's fleet.\n\n");
218:
219:
220.
 221:
222:
223.
224:
225:
                          delay(1);
                         delay(1);
printf("\t\t\tBattleship is known worldwide as a pencil and paper game which dates from World War I. It\n");
printf("\t\t\tBattleship is known worldwide as a pad-and-pencil game in the 1930s and was released as\n");
printf("\t\t\taparta plastic board game by Milton Bradley in 1967. The game has spawned electronic versions, \n");
printf("\t\t\taparta t\taparta games), smart device apps and a film.\n\n");
226:
227.
229:
230:
                          delav(1):
231 .
                         233:
234.
235:
236:
237:
238
 239: //creating the function for Setting option
240:
241: void setting_tab()
242.
                               printf("\n\n\n
printf("\n\n\n
printf("\n\n\n);
printf("\t\n\n");
printf("\t\t\t\t\t\ > 1. Change player Name \n");
printf("\t\t\t\t\t\ > 2. Mode of Game \n");
printf("\n\n\t\t\t\t\t\ >>> Enter your choice ? ");
scanf("\angle \angle \an
                                                                                                                             ----- Setting -----
244:
245.
247:
248:
249.
251:
252:
                         //while(1)
                         ///www...////
switch(setting_op)
253.
255:
256
                                         case 1:
 257:
                                                 delay(1);
                                                 players_setting();//Calling the setting functionx
 258:
259:
                                                 break:
260.
                                         case 2:
                                                 delay(1);
                                                 printf("\n\n\t\t\t\t ---- Comming soon ----");
262:
263:
                                                 break:
264
                                         case 3:
    delay(1);
    printf("\n\n\t\t\t\t\t\t\t\---- Wait Going Back ----\n\n\n");
266:
267
                                                 delay(1);
printf("\n\n\t\t\t\t\t\t\t\t\----\n\n\n");
 269:
                                                  break;
270:
                                         default:
                                               printf(" Invalid input ");
break;
271 •
273:
                      //}
274:
275
 276: //creating the function for Players option
277:
278: void players_setting()
279:
                 printf("\t\t\t\t ------ Changing The Player Name ------
printf("\t\t\t\t\t>>> Enter The Players name ? : " );
                                                                                                                                                                               \n\n\n");
280:
281:
282.
                 printf("\n\n\t\t\t\t\-----\n\n\n\n");
printf("\n\n\t\t\t\t\-----\n\n\n\n");
284:
285:
286
 287:
288:
289: }
291: //
                 creating a function for
292: void help()
293: {
                                                                                                                                                                                                                                                       ·----\n\n\n");
295:
                  printf("\n\t<- Go Back (Enter 3 ) \t\t
296:
                                                                                                              ----- HE1P & FAO'S -----
                                                                                                                                                                                                                                   \n\n\n\n");
297
                 printf("\n\n\t\t\t 1. What is a matrix? \n");
printf("\t\tANS:- A matrix is a rectangular array of numbers or symbols. It is a data structure that can be used to represent\n\t\t the game board in Battleship.");
printf("\n');
printf("\n'\t\t\t 2. How can matrices be used to represent the game board in Battleship? \n ");
printf("\t\t\t\tANS:-Each cell in the matrix can represent a square on the game board. The numbers or symbols in the cells can represent\n\t\t\t the status of the square, such as wheth
299:
 300.
 301:
 302:
303:
                  printf("\n ");
                  304:
                  printf("\n ");
printf("\n ");
306:
 307:
 308.
                  printf("\t\t\t1D matrix: A 1D matrix can be used to represent a game board with a single row or column.");
                  printf(
                  printf("\n ");
printf("\t\t\t2D matrix:A 2D matrix can be used to represent a game board with multiple rows and columns.");
310:
311 •
                  nrintf("\n
                  313:
314:
                  printf("\n");
                  printf("\n\t\t\t 5. What are the disadvantages of using matrices to represent the game board in Battleship? \n");
printf("\t\tANS:- Matrices can be difficult to visualize, especially for large game boards. They can also be inefficient if the game \n\t\t\board is sparse, meaning that most of t
315
317:
                  printf("\n");
                  printf('\n");
printf("\t\t\t 6. How can the efficiency of matrices be improved for sparse game boards?\n");
printf("\t\t\tANS:- The efficiency of matrices can be improved for sparse game boards by using a sparse matrix. A sparse matrix is\n\t\t a matrix that has a lot of zeros. Sparse ma
318:
319
                  printf("\n");
                  printf("\f");

printf("\t\t\tans:- The visualization of matrices be improved for large game boards?\n");

printf("\t\t\tans:- The visualization of matrices can be improved for large game boards by using a graphical user interface (GUI).\n\t\t\t A GUI can be used to display the matrix on
321:
 322.
                 printf("\n");
printf("\n\t\t\t 8. How can matrices be used to implement the rules of the Battleship game? \n");
```

```
printf("\t\tANS:- The rules of the Battleship game can be implemented using matrices by tracking the status of each square on the \n\t\t\tgame board. For example, a 1D matrix can be
                   printf("\n");

printf("\n'\t);

Printf("
326:
327:
328
                   printf("\n\t\t\t 10. How can matrices be used to improve the AI of the Battleship game? \n");

printf("\t\t\tans:- Matrices can be used to improve the AI of the Battleship game by tracking the history of the game and using this \n\t\tinformation to make better decisions. For
330:
331 •
                   333:
334:
335.
337:
                    printf("\n");
338:
                    printf("\t\t\* Storing the game rules.");
                   printf("\n");
printf("\t\t\t\t\* Generating random game boards.");
339.
341:
                    printf("\t\t\t* Evaluating the strength of different strategies.");
342.
                   printf("\n\n\n\n");
345:
346
348:
349: }
350.
352: // how to play section
353: void how_to_play()
355:
                   printf("\t\t\t\t\t\t\t\t------ HOW TO PLAY BATTLESHIP GAME USING MATRICES -----\n\n"):
356:
357.
                  359:
360:
361
363:
364
366:
                   printf("\n\t\t\t Taking Turns: Players take turns firing shots at the opponent's grid by specifying the row and column coordinates. \n\t\t\t For example, (3, 5) refers to the cell in printf("\n\t\t\t Hit or Miss: When a player fires a shot, the opponent checks their game board's corresponding cell. If there's a ship\n\t\t\t\t in that cell, it's a 'HIT'; otherwise, printf("\n\t\t\t\t Marking the Grid: To keep track of the game, players should mark their board using symbols. For example, 'X'can represent\n\t\t\t\t a hit, and '0' can represent a miss printf("\n\t\t\t\t\t\t Sinking Ships: When all cells of a ship have been hit, it is considered 'sunk' Players should announce when they have sunk\n\t\t\t\t\notate mo of their opponent's ships.\n");
367:
368
370:
371:
372
374:
375
                   printf("\n\t\t\t\t\t\t\t\t\-----\n\n");
                  printf("\n\t\t\t >>>> VICTORY: The game continues until one player's entire fleet is sunk. The player who sinks all of their opponent's ships first\n\t\t\t wins the game.\n");
printf("\n\t\t\t >>>> VICTORY: The game continues until one player's entire fleet is sunk. The player who sinks all of their opponent's ships first\n\t\t\t wins the game.\n");
printf("\n\t\t\t >>>> STRATEGIES: \n\t\t\t\t USE CORRINATES SYSTEMATICALLY:Start by targeting different areas of the opponent's board systematically. \n\t\t\t\t For example, you can sta
printf("\n\t\t\t >>>> CONCENTRATE FIRE: Once you hit a ship, concentrate your fire on that area to sink it as quickly as possible. Also consider the\n\t\t\t size of the remaining shi
printf("\n\t\t\t >>>> BLUFFING: Occasionally, make random shots in areas where you have no ships. This can confuse your opponent's strategy. \n");
printf("\n\t\t\t >>>>> CONCENTRATE JULES\n\t\t\t\t\t\t SPECIAL SHOTS: Introduce special shots like 'salvo' (multiple shots per turn), 'radar' (revealing a small area\n\t\t\t\t for the opponent's
printf("\n\t\t\t\t >>>>> CONCLUSION\n\t\t\t\t Playing Battleship using matrices adds a strategic element to the game while providing a clear representation of\n\t\t\t the playing field. I
printf("\n\t\t\t Have a great time playing Battleship with matrices! \n");
printf("\n\t\t\t\t Feel free to customize this guide, add visuals, or adapt it for your audience as needed. Enjoy playing Battleship with the \n\t\t\t matrix-based approach!");
printf("\n\n\n");
377:
378:
379
381:
382:
383.
385:
386
388: }
389:
390: // this for the play section only created yestarday 10/09/2023
392: void delav(int second){
393:
394: int milsec = 1000 * second:
396: clock t startTime = clock():
397
398: while(clock() < (startTime + milsec));</pre>
400:
401: void play_hard()
                   delay(1);
403:
                   printf("\n\t\t\t\t\t\t\t\t\t\-----\n\n\n");
404:
405
                   delay(1);
printf("\n\t\t\t\t\t First Arrange The 5 Ship According To You In A Matrix \n");
                   407:
408
410:
                   delay(1);
printf("\n\t\t\t\t\t\t Note : ");delay(1);
411:
412
                   delay(1);
printf("While placing The Ship Do Not Enter Same Index ");
414:
415:
                   printf("\n\t\t\t\t if you entered the same Index then You will Loose Your 1 Ship vice versa \n\n\n\n");
416
418:
419
                   for(i=0;i<size;i++)</pre>
420:
                            for(j=0;j<size;j++)</pre>
421:
422:
423.
                                    user_board[i][j]='~';
425:
426:
                           3
427
429:
430.
                    // Display the user The Board where HE wants to place The Ships
                    delay(1);
```

```
433:
         printf("\t\t\t\t\t\t\t\t\t 0 1 2 3 4 5 6 7 8 9 \n");
434:
435:
         for(i=0:i<size:i++)</pre>
436:
437:
             printf("\t\t\t\t\t\t\t\d",num); // This is for the Linear Matrix
438:
439.
440:
441:
             for(j=0;j<size;j++)</pre>
442:
443:
444:
445:
                 printf("%c ",user_board[i][j]);
                      printf("\n");
446:
447:
448:
          // now Lets Give a Chance To user To Put The Ships accoring to Hme
449:
          for(k=1;k<=num_ship;k++)</pre>
450.
451:
452:
             453:
454:
456:
             while(1)
457:
458
                 delay(1);
printf("\n\t\t\t\t\t Enter the Row from ( 0 - 9 ) : ");
scanf("%d",&put_ship_row);
delay(1);
printf("\n\t\t\t\t\t Enter the Column from (0 - 9) : ");
scanf("%d",&put_ship_column);
460:
461 .
462:
463:
464:
465
                  // checking for the same input for 1 ship
467:
468:
469
                 if(put_ship_row>9 || put_ship_column>9)
                     delay(1);
printf("\n\n\t\t\t\t\t Enter the vaild Input Again!!\n");
471:
472
473:
474:
                  else if(put_ship_row<0 || put_ship_column<0)
475:
476:
477:
478:
                     delay(1);
printf("\n\t\t\t\t Enter the vaild Row and Column Again !!");
479:
480.
                  else
                      user_board[put_ship_row][put_ship_column]='S';
482:
483.
                      break:
484:
485:
486:
487
488:
489:
             printf("\n\n");
                after Placing the ships in Matrix by user Then display the Same
490:
             display_user_board();
491:
           / when The User Will put The Ships On Specific Position Then Message That
493:
         494
495:
496:
497:
498
500: delay(1);
501: for(i=0;i<num_ship;i++)
502:
503:
         put_random_row=getRandomNumber( 0, size-1);
put_random_column= getRandomNumber(0, size-1);
504:
505
506:
507:
         508:
509
511: }
512:
         513:
514:
         while(player_hits < num_ship && computer_hits < num_ship )</pre>
515:
516
517:
518:
             target_computer();
target_user();
519:
520.
             if(player_hits == num_ship)
                 delay(1);
printf("\n\n\t\t\t\t\t Congratulation!! You won the game ");
522:
523:
524:
525:
             else if(computer_hits == num_ship)
526:
                 delay(1);
printf("\n\t\t\t\t Bad Luck You Loss the Game Try again .... ");
527
528:
529:
530:
531:
         }
533:
534:
535: }
536: // declaring the Functions
537:
538
539:
540:
```

```
542:
543:
544: void target_computer()
545: {
546: delay(1);
           delay(1);
printf("\n\n");
delay(1);
printf("\n\t\t\t\t\t\t\t\t\t
547 .
548:
549:
                                                      Your Board \n");
550:
            delav(1):
           delay(1);
display_user_board();
//ctarget_row for Targetting the Row of Computer ;
//ctarget_column for targetting the column of Computer;
551:
553:
554:
555:
556:
           while(1)
                 delav(1):
557:
                 printf("\n\t\t\t\t\t Enter the Targeted Row : ");
scanf("%d",&ctarget_row);
558
559:
560:
                 561:
562
563:
564:
                      565:
566:
567:
568:
569
570:
                 else if(ctarget_row<0 || ctarget_column<0 )
571:
                      572:
573:
575:
576:
577:
578:
                  else
579:
                      break:
580
581:
582:
           }
583:
584:
            if(computer_board[ctarget_row][ctarget_column]=='S' )
586:
                 delay(1);
printf("\n\n\t\t\t\t\t\t\***)> You Hit");
computer_board[ctarget_row][ctarget_column]='H';
player_hits++;
587:
588:
589:
590:
591 •
592:
593:
                 delay(1);
printf("\n\t\t\t\t\t\t\">>> You Miss");
computer_board[ctarget_row][ctarget_column]='X';
594:
595:
596:
597:
598:
599:
600:
601: }
602
604: void target_user()
605: {
           //utarget_row; is USe to target The Users MAtrix by Computer Row
//utarget_column; is Use to target The userd matrix by column
printf("\n\n");
606
608:
           print( \n\n);
utarget_row=getRandomNumber( 0, size-1);
delay(1);
printf("\n\t\t\t\t\t\ Computer Entered the Row index .... %d ",utarget_row);
utarget_column=getRandomNumber( 0, size-1);
delay(1):
609:
610:
611:
612:
           delay(1);
printf("\n\t\t\t\t\t\Computer Entered the Column index .... %d ",utarget_column);
613
615:
616:
617:
           if(user_board[utarget_row][utarget_column]=='S' )
619:
                 printf("\n\n\t\t\t\t\t\t>>>> Computer Hit");
user_board[utarget_row][utarget_column]='H';
computer_hits++;
620:
621:
622:
623:
624
            else
625:
                 delay(1);
printf("\n\n\t\t\t\t\t\t\">>>> Computer Miss");
user_board[utarget_row][utarget_column]='X';
626:
627:
628
630:
631:
632: }
633:
634: void display_user_board()
635: {
           num=0;
printf("\t\t\t\t\t\t\t\ 0 1 2 3 4 5 6 7 8 9 \n");
637:
638:
639
            for(i=0;i<size;i++)</pre>
641:
                 printf("\t\t\t\t\t\t\t\t\t\t\d",num); // This is for the Linear Matrix
642:
643:
644:
                 for(j=0;j<size;j++)</pre>
645:
646
647:
648:
                      printf("%c ",user_board[i][j]);
```

```
649: printf("\n");
650:
651: }
652:
653: }
654:
655:
656:
657:
658:
```