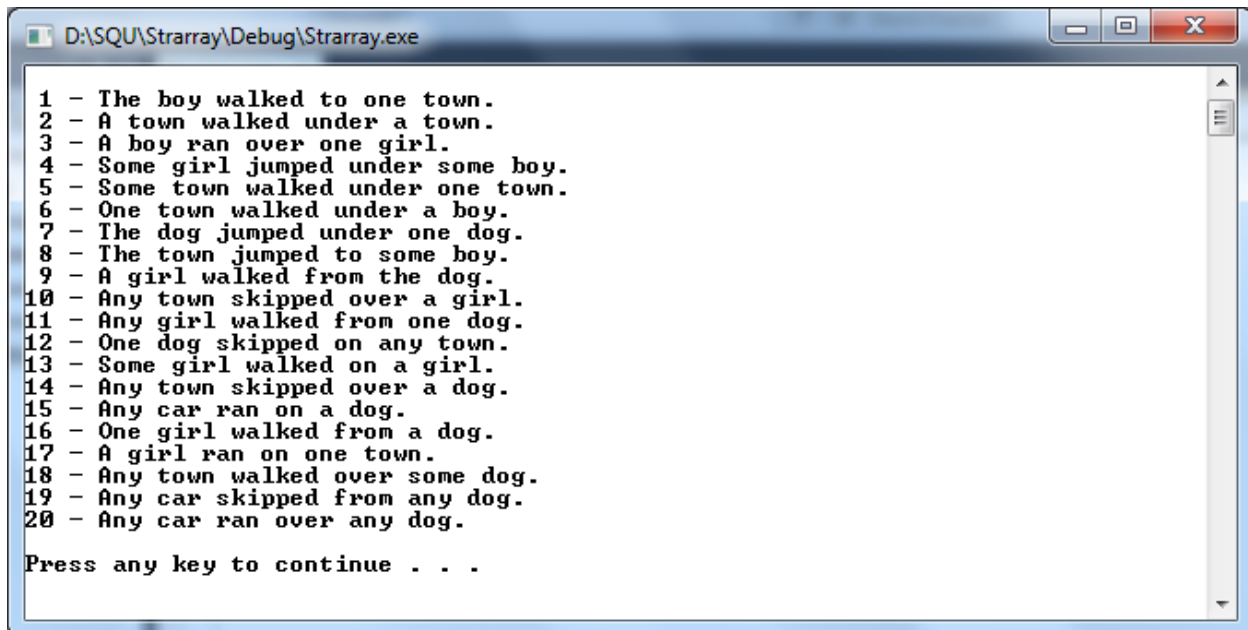**Sultan Qaboos University**
Department of Computer Science
COMP2102: Problem Solving and Programming, Spring2013
Assignment 2-Due Date: 03/04/13

1- Write a C++ program that uses random number generation to create sentences. Use four arrays of strings called **article, noun, verb** and **preposition**. Create a sentence by selecting a word at random from each array in the following order: **article, noun, verb, preposition, article and noun**. As each word is picked concatenate in to previous words in the sentence. The words should be separated by spaces. When the final sentence is output, it should start with capital letter and end with a period. The program should generate **20 sentences** and then print them to a screen. The arrays should be filled as follows: The **article** array should contain the articles **"the", "a", "one", "some" and "any"** ;the **noun** arrays should contain the nouns **"boy" ,"girl" ,"dog" ,"town" and "car"** ;the **verb** array should contain the past-tense verbs **"drove" ,"jumped" ,"ran" ,"walked" and "skipped"**; the **preposition** array should contain the prepositions **"to" ,"from" ,"over" ,"under" and "on".**

Hint: Use the following array declarations:-
string article[MAXITEMS]={"the","a","one","some","any"};
string noun[MAXITEMS]={"boy","girl","dog","town","car"} ;
string verb[MAXITEMS]={"drove","jumped","ran","walked ","skipped"} ;
string preposition [MAXITEMS]={"to","from","over","under","on"};

```
D:\SQU\Strarray\Debug\Strarray.exe

 1 - The boy walked to one town.
 2 - A town walked under a town.
 3 - A boy ran over one girl.
 4 - Some girl jumped under some boy.
 5 - Some town walked under one town.
 6 - One town walked under a boy.
 7 - The dog jumped under one dog.
 8 - The town jumped to some boy.
 9 - A girl walked from the dog.
10 - Any town skipped over a girl.
11 - Any girl walked from one dog.
12 - One dog skipped on any town.
13 - Some girl walked on a girl.
14 - Any town skipped over a dog.
15 - Any car ran on a dog.
16 - One girl walked from a dog.
17 - A girl ran on one town.
18 - Any town walked over some dog.
19 - Any car skipped from any dog.
20 - Any car ran over any dog.

Press any key to continue . . .
```
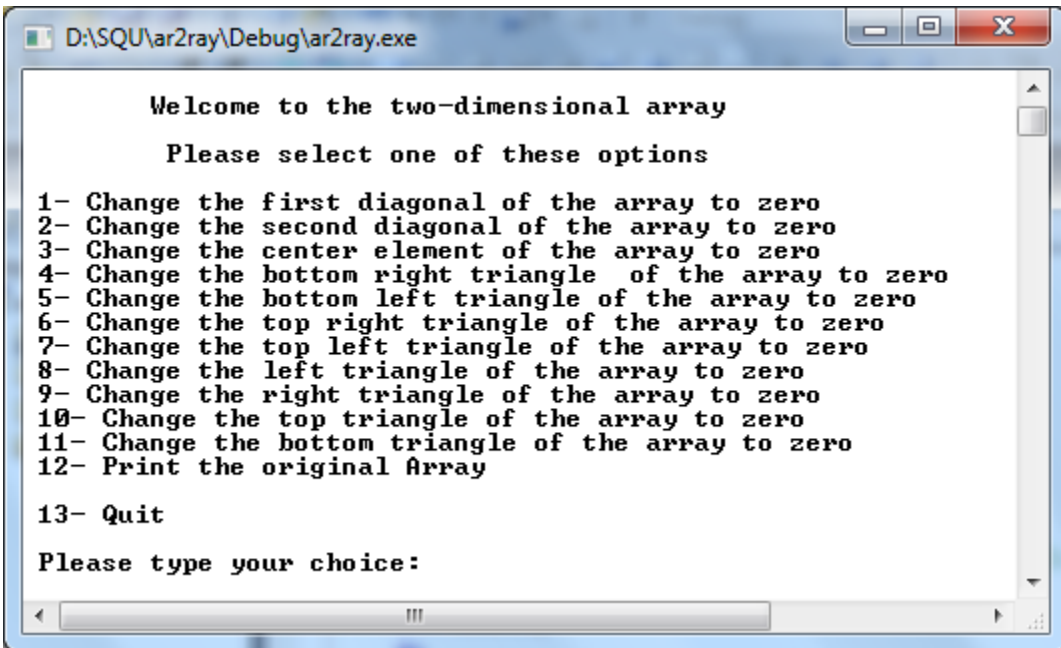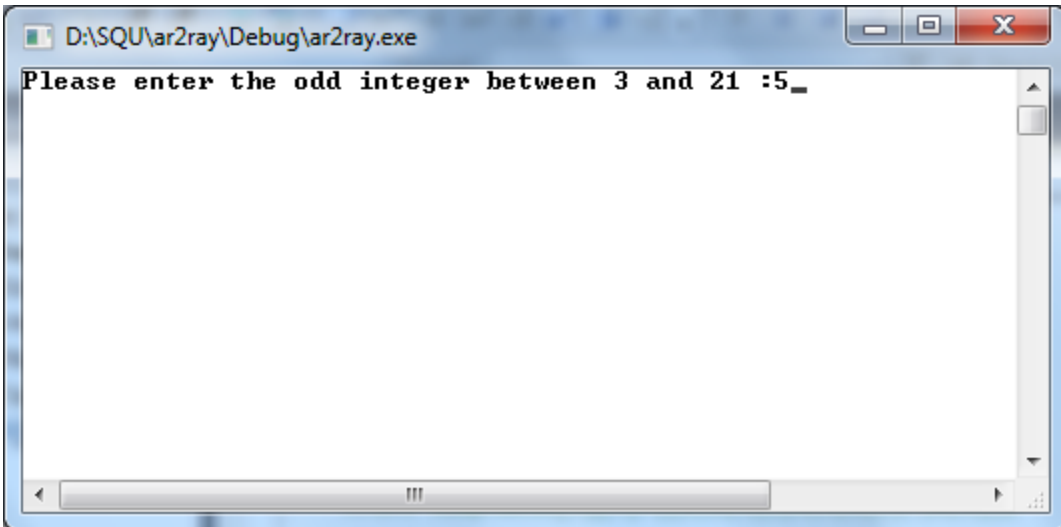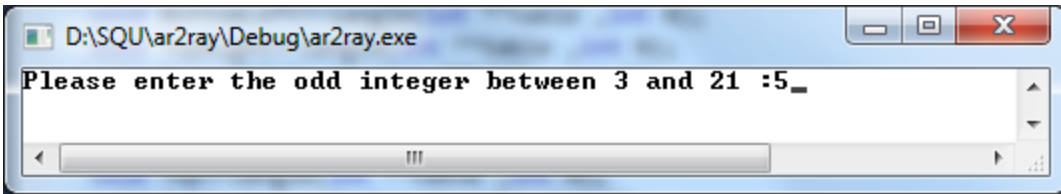
2- Write a C++ program that creates and manipulates an $N \times N$ dynamic two-dimensional array storing random positive numbers between 1 and 9. N is an odd integer between 3 and 21 entered by the user. Your program should offer the following menu options:

a- Change the first diagonal of the array to zero.
b- Change the second diagonal of the array to zero.
c- Change the center element of the array to zero.
d- Change the top right triangle of the array to zero.
e- Change the bottom left triangle of the array to zero.
f- Change the top left triangle of the array to zero.
g- Change the bottom right triangle of the array to zero.
h- Change the left triangle of the array to zero.
i- Change the right triangle of the array to zero.
j- Change the top triangle of the array to zero.
k- Change the bottom triangle of the array to zero.
l- Print the original Array.

Note: Your program should print the resulting array after each operation and then restore the original array before the next operation.

Hint: Use the following functions:-
   a- void FirstDiagonal(int **table, int N);
   b- void SecondDiagonal(int **table, int N);
   c- void CenterElement(int **table, int N);
   d- void TopRightTriangle(int **table, int N);
   e- void BottomLeftTriangle(int **table, int N);
   f- void TopLeftTriangle(int **table, int N);
   g- void BottomRightTriangle(int **table, int N);
   h- void LeftTriangle(int **table, int N);
   i- void RightTriangle(int **table, int N);
   j- void TopTriangle(int **table, int N);
   k- void BottomTriangle(int **table, int N);
   l- void PrintArray(int **table, int N);
   m- void SaveOrginalTable(int **table, int **temptable, int N);
   n- void RestoreOrginalTable(int **table, int **temptable, int N);

```
D:\SQU\ar2ray\Debug\ar2ray.exe                                    [ _ ][ □ ][ X ]

Please enter the odd integer between 3 and 21 :5_
```

```
D:\SQU\ar2ray\Debug\ar2ray.exe                                    [ _ ][ □ ][ X ]

Please enter the odd integer between 3 and 21 :5_
```

```
D:\SQU\ar2ray\Debug\ar2ray.exe                                    [ _ ][ □ ][ X ]

          Welcome to the two-dimensional array

            Please select one of these options

1- Change the first diagonal of the array to zero
2- Change the second diagonal of the array to zero
3- Change the center element of the array to zero
4- Change the bottom right triangle  of the array to zero
5- Change the bottom left triangle of the array to zero
6- Change the top right triangle of the array to zero
7- Change the top left triangle of the array to zero
8- Change the  left triangle of the array to zero
9- Change the right triangle of the array to zero
10- Change the top triangle of the array to zero
11- Change the bottom triangle of the array to zero
12- Print the original Array

13- Quit

Please type your choice:
```

1

```
0    1    6    4    4
4    0    6    9    4
4    2    0    7    4
8    9    3    0    3
9    5    8    8    0
Press any key to continue .
```

2

```
6    1    6    4    0
4    6    6    0    4
4    2    0    7    4
8    0    3    3    3
0    5    8    8    5
Press any key to continue .
```

3

```
6    1    6    4    4
4    6    6    9    4
4    2    0    7    4
8    9    3    3    3
9    5    8    8    5
Press any key to continue .
```

4

```
6    1    6    4    0
4    6    6    0    0
4    2    0    0    0
8    0    0    0    0
0    0    0    0    0
Press any key to continue .
```

5

```
0    1    6    4    4
0    0    6    9    4
0    0    0    7    4
0    0    0    0    3
0    0    0    0    0
Press any key to continue .
```

6

```
0    0    0    0    0
4    0    0    0    0
4    2    0    0    0
8    9    3    0    0
9    5    8    8    0
Press any key to continue .
```

7

```
0    0    0    0    0
0    0    0    0    4
0    0    0    7    4
0    0    3    3    3
0    5    8    8    5
Press any key to continue .
```

8

```
0    1    6    4    4
0    0    6    9    4
0    0    0    7    4
0    0    3    3    3
0    5    8    8    5
Press any key to continue .
```

9

```
6    1    6    4    0
4    6    6    0    0
4    2    0    0    0
8    9    3    0    0
9    5    8    8    0
Press any key to continue .
```

10

```
0    0    0    0    0
4    0    0    0    4
4    2    0    7    4
8    9    3    3    3
9    5    8    8    5
Press any key to continue .
```

11

```
6    1    6    4    4
4    6    6    9    4
4    2    0    7    4
8    0    0    0    3
0    0    0    0    0
Press any key to continue .
```

12

```
6    1    6    4    4
4    6    6    9    4
4    2    8    7    4
8    9    3    3    3
9    5    8    8    5
Press any key to continue .
```

Sultan Qaboos University
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COMP2102: Problem Solving and Programming, Spring2013
Assignment 2-Due Date: 03/04/13

Student ID: _____   Student Name: _____   Section: _____

Submission Policy and Grade Distribution

Task	Marks	Comment
Proper style (indentation, naming, spacing, comments)	**5**	
Appropriate use of function	**10**	
Correct function main logic and processing	**20**	
Correct output and result	**5**	
Program free of compilation errors and warnings	**5**	
Program free of run-time errors	**5**	
Total	**50**	

- **Name your program as A2_XXXXXX where XXXXXX is your university ID.**
- **Upload only your .cpp solution program to Assignment 2 link in Moodle.**