WIA1002 Data Structure
Lab 3: Recursion and Exception Handling

1. There are n switches in the campus. You are required to create a mesh topology for the switches. Write a recursive method to returns the total number of connections required for n switches in the campus.

```
Mesh Topology
There are 4 switches in the campus.
The total number of connections required is 6
There are 7 switches in the campus.
The total number of connections required is 21
```

2. Define a recursive method that read lines of text from one file and then output the lines in reserve order in another file.

3. Define a recursive method that displays all n! Permutations of an integer array elements. The main method will accept the number of elements from user and generate the random number within 0 and 9 for the elements of the array. Example output:

```
Enter number of elements: 3
The elements of the array: 436
436
463
346
364
634
643
```

Modify the program above to display the non-duplicate integer. Example output:

```
Enter number of elements: 4
The elements of the array: 5520
5520
5502
5250
5205
5025
5052
2550
2505
2055
525
552
255
```

4. Create a program to display the day, month, year and the name of the day for today date. Write a recursive method to display the name of the day of the past date. (Tip: use the today date as the parameters for the recursive method). Example output:

```
Today Date (dd/mm/yyyy): 13/4/2016
Today is on Wednesday
Search Date (dd/mm/yyyy): 20/8/2015
Search Date is on Thursday
```

5. Write a program that creates an integer array with 5 elements. The program accepts user input for the elements of the array. Use exception handling to detect improper inputs. The user needs to enter the correct input to continue. The program will stop if ArrayIndexOutOfBoundsException is encountered. The program will display all integers entered by the user. Example output:

```
Enter an Integer: 12
Enter an Integer: hello
Invalid input type
Enter an Integer: 23
Enter an Integer: 86.7
Invalid input type
Enter an Integer: 32
Enter an Integer: 10
Enter an Integer: 92
Enter an Integer: 2
The array of integers is:
12 23 32 10 92
```