INTE2512 Object-Oriented Programming

Lab – Strings & Arrays

1. Write a program that prompts the user to enter a year and a string of three characters for a month name (with the first letter in uppercase) then displays the number of days in the month. If the user enters an invalid value for year or month, print out a helpful error message. Sample run:

```
Enter a year: 2001 ↵Enter
Enter a month: Jan ↵Enter
Jan 2001 has 31 days
```

4. Write a program that prompts the user to enter three cities and display them in ascending order. Sample run:

```
Enter the first city: Chicago ↵Enter
Enter the second city: Los Angeles ↵Enter
Enter the third city: Atlanta ↵Enter
The three cities in alphabetical order are Atlanta Chicago Los Angeles
```

2. Write a method that takes a string and returns its reverse. For example, if the given string is "Good day" then the method returns "yad dooG".

3. A palindrome is a string that reads the same backward as forward when ignoring punctuations, blanks and case difference. For example, "madam", "Hannah", "Step on no pets", "Was it a car or a cat I saw?", "A man, a plan, a canal, Panama!" are all palindromes. Write a method that checks if a given string is a palindrome or not. Hint: use the method in the last exercise.

4. Write a program that determines if a list is already sorted in increasing order. The program should prompt the user to enter a list and displays whether the list is sorted in ascending order or not. Note that the first number in the input indicates the number of the elements in the list. The program exits when the first number is 0. Sample run:

```
Enter list: 10 1 1 3 4 4 5 7 9 11 21 ↵Enter
The list is already sorted

Enter list: 8 10 1 5 16 61 9 11 1 ↵Enter
The list is not sorted
```

5. Write a program that generates 100 random integers between 0 and 9 then displays the count for each number. Hint: use the method Math.random().

6. Write a program that reads an unspecified number of scores in one input and determines how many scores are above or equal to the average and how many scores are below the average.

7. Write a program that reads in ten integers between 1 and 100 then displays the number of distinct integers and the distinct integers separated by exactly one space (i.e., if a number appears multiple times, it is displayed only once). Here is the sample run of the program:

```
Enter ten numbers: 1 2 3 2 1 6 3 4 5 2  ↵Enter
The number of distinct number is 6
The distinct numbers are: 1 2 3 6 4 5
```

8. Write a program that reads a list of integers between 1 and 100 then counts the occurrences of each. Assume that the user always input value integers and the input always ends with 0. Sample run:

```
Enter the integers between 1 and 100: 2 5 6 5 4 3 23 43 2 0  ↵Enter
2 occurs 2 times
3 occurs 1 time
4 occurs 1 time
5 occurs 2 times
6 occurs 1 time
23 occurs 1 time
43 occurs 1 time
```

Note that if a number occurs more than one time, the plural word "times" is used in the output.