

National University of Computer and Emerging Sciences, Lahore Campus



Course:	PF Lab	Course Code:	CL-118
Program:	BS (Computer Science)	Semester:	Fall 2019
Duration:	150 Minutes	Total Marks:	60(30+30)
Paper Date:	28 Nov 2019	Weight	40%
Section:	All	Page(s):	2
Exam:	Final Term	Reg. No	

Instruction/Notes:

1. Understanding the question paper is also part of the exam, so do not ask any clarification.
2. No USB's, PHONES and INTERNET are allowed.
3. Talking/Discussion is not allowed. It is your responsibility to protect your code and save it from being copied. If you don't protect it all matching codes are considered copy/cheating cases.
4. Submission Path is:

Question # 1:

Data distribution Empirical rule:

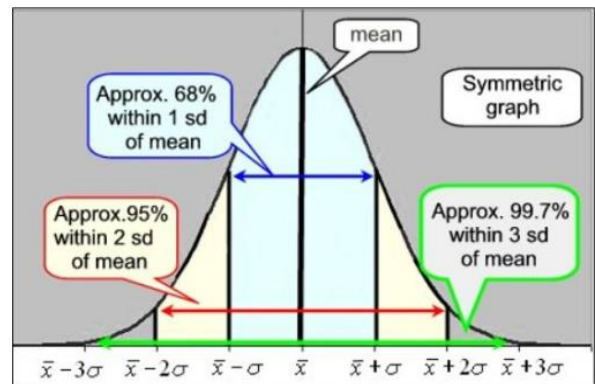
The center of the graph is the mean. The height and width of the graph are determined by the standard deviation.

1. When the standard deviation is small, the curve will be tall and narrow in spread.
2. When the standard deviation is large, the curve will be short and wide in spread.

Standard Deviation:

$$s = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{N - 1}}$$

S	=	sample standard deviation
N	=	total values
X _i	=	a single value from sample data
\bar{X}	=	the average value of the data



So, in this question **Rule of the thumb** is, at least 65% and at most 75% values lie within 1st standard deviation from mean. Which means the **count** of values which are bigger than ($\bar{X} - S$) and lesser than ($\bar{X} + S$). Percentage will be calculated through $(\text{count} / N) * 100$. The data will be in Good Bell Shape if it follows the **Rule of Thumb**.

Sample Output:

Sample Data: 42 34 69 79 62 6 82 61 95 28

Sorted Data: 95 82 79 69 62 61 42 34 28 6

Average of Data: 55.8

Standard Deviation: 26.3051

The percentage of data within 1st standard deviation is: 70%

Good Bell shape

You need to implement these functions in order to meet the given sample output.

```
void sort(float arr[], int size);           //sorts the elements
float getStandardDeviation(float arr[], int size); //returns the standard deviation
float getAverage(float arr[], int size);      //returns the average value
void inputArray(float arr[], int size);       // input array from (0-99)
float percentage(float arr[], int size, float average, float std); //returns the percentage
```

The size of array is 10.

Write a main function which calls inputArray function to generate a sample data and then call other functions to generate Output.

Question # 2:

You need to write a c++ program which asks the user to enter the data in character array. Then you remove all the duplicate words from the data and print the updated data on console.

You need to implement these functions in order to meet the given sample output.

```
void removeDuplicateWords(char arr[]);
```

This function receives the array and removes duplicate words. This function makes a new character array to store a word. When a word is formed, it calls the function findSubString with the array, substring and an index value, from where the search should start.

```
int findSubString(char arr[], char sub[], int index);
```

This function receives an array of characters and a substring to be searched and an index value, from where the search will start. This function returns the index where the substring is found else it returns -1.

Sample I/O:

Input: Hello. I am Muslim. I am going to Lahore. Hello.

Output: Hello. I am Muslim. Going to Lahore.