| ***Computer Engineering Department*** |
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| ***CE100L: Computing Fundamentals & Programming*** |

| ***Course Instructor: Usama Bin Shakeel*** | ***Dated: 08/11/2021*** |
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| ***Teaching Assistant: Aqsa Khalid*** | ***Semester: Fall 2021*** |
| ***Lab Engineer: Nadir Abbas*** | ***Batch: BSCE2021*** |

# **Lab 7A. Arrays**

| **Name** | **Roll number** | **Report**  **(out of 100)** | **Scaled to 10** | **Total**  **(out of 10)** |
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Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## **Objective**

The objective of this session is to learn the working and advantages of arrays in C++.

## **Equipment and Component**

| **Component Description** | **Value** | **Quantity** |
| --- | --- | --- |
| Computer | Available in lab | 1 |

## **Conduct of Lab**

1. Students are required to perform this experiment individually.
2. In case the lab experiment is not understood, the students are advised to seek help from the course instructor, lab engineers, assigned teaching assistants (TA) and lab attendants.

## **Theory and Background**

An array is a sequence of objects of the same data type. The objects in an array are also called elements of an array. An array is represented in the computer memory by a consecutive group of storage locations. These locations are referenced by a single variable called array name. Each element of an array is referenced by its position in an array.

**Lab Task**

Write a program that allows the user to enter the number of votes received by 5 candidates. The program should then output the candidate's number, the number of votes received, and the percentage of the total votes received by the candidate. A sample output is:

Candidate Votes Received % of Total Votes

1 5000 25.91

### Write pseudocode

| Input array[num],percentage[num]  Where num=5  Make a loop to enter the votes of each candidate  For( int u=0; u<=4;u++)  {  Output “Enter number of votes”  Read arr[u]  }  Set sum=0  For (int v=0;v<=4;v++)  {  Sum=sum+arr[v]  }  For(int w=0;w<=4;w++)  {  Percentage[w]=(arr[w]\*100/)total  }  For(input x=0;x<=4;x++)  {  Output x+1 arr[x] percentage[x] |
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1. Draw flowchart

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1. Write C++ program

| int votes[10];  int sum=0;  int percentage[5];  int tableOfVotes()  {  float percen[5]; //initializing percent array of 5c  int sum =0; //initializing sum  double votes[5]; //initializing votes of 5 array  for (int t = 0; t < 5;t=t+1) //for loop  {  cout<<" How many votes did "<<t+1<< " candidate received ?"<<endl;  cin>>votes[t]; //taking votes from the user  }  for(int u=0;u<5;u=u+1)  {  sum=sum+votes[u]; //taking sum  }  int z=0;  for(int v=0;v<5;v=v+1)  {  percen[z]=(votes[v]/sum)\*100; //calculating percentage  z++;  }  for (int s= 0; s<5; s=s+1)  {  cout<<" Candidate " <<s+1<<" :"<<endl; //displaying canidates  cout<<" Votes received = "<<votes[s]<<endl; //displaying votes received  cout<<" Percentage of Total votes : "<<percen[s]<<endl; //displaying percentage  }  } |
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#### **Assessment Rubric for Lab**

**Method for assessment:**

Lab reports and instructor observation during lab sessions. Outcome assessed:

a. Ability to conduct experiments, as well as to analyze and interpret data (P) b. Ability to function on multi-disciplinary teams (A)

c. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (P)

| Performance metric | Mapping (task no. and description) | | Max marks | Exceeds expectation | Meets expectation | Does not meet expectation | Obtained marks |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Realization of experiment (a) | 1 | Functionality | 40 | Executes without errors excellent user prompts, good use of symbols, spacing in output. Through testing has been completed (35-40) | Executes without errors, user prompts are understandable, minimum use of symbols or spacing in output. Some testing has been completed (20-34) | Does not execute due to syntax errors, runtime errors, user prompts are misleading or non-existent. No testing has been completed (0-19) |  |
| 2. Teamwork (b) | 1 | Group Performance | 5 | Actively engages and cooperates with other group member(s) in effective manner (4-5) | Cooperates with other group member(s) in a reasonable manner but conduct can be improved (2-3) | Distracts or discourages other group members from conducting the experiment (0-1) |  |
| 3. Conducting experiment (a, c) | 1 | On Spot Changes | 10 | Able to make changes (8-10) | Partially able to make changes (5-7) | Unable to make changes (0-4) |  |
| 2 | Viva | 10 | Answered all questions (8-10) | Few incorrect answers (5-7) | Unable to answer all questions (0-4) |  |
| 4. Laboratory safety and disciplinary rules (a) | 1 | Code commenting | 5 | Observes lab safety rules; handles the equipment and parts with care and adheres to the lab disciplinary guidelines aptly (4-5) | Generally observes safety rules and disciplinary guidelines with minor lapses (2-3) | Disregards lab safety and disciplinary rules (0-1) |  |
| 5. Data collection (c) | 1 | Code Structure | 5 | Excellent use of white space, creatively organized work, excellent use of variables and constants, correct identifiers for constants, No line-wrap (4-5) | Includes name, and assignment, white space makes the program fairly easy to read. Title, organized work, good use of variables (2-3) | Poor use of white space (indentation, blank lines) making code hard to read, disorganized and messy (0-1) |  |
| 6. Data analysis (a, c) | 1 | Algorithm | 20 | Solution is efficient, easy to understand, and maintain (15-20) | A logical solution that is easy to follow but it is not the most efficient (6-14) | A difficult and inefficient solution (0-5) |  |
| 7. Computer use (c) | 1 | Documentation | 5 | Timely documented (4-5) | Late documented (2-3) | Not documented (0-1) |  |
|  | Max Marks (total): | | 100 | Obtained Marks (total): | | |  |

Lab Engineer Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_