**PSG COLLEGE OF TECHNOLOGY, COIMBATORE -641 004**

**Department of Applied Mathematics and Computational Sciences**

**II Semester MSc Software Systems**

**18XW26 Data Structures Lab – Arrays**

1. A List of N numbers is given. Write a program to find
   * 1. Their average and standard deviation
     2. The number of integers, which are greater than or equal to a specified number in the list.
2. Write a program to process a collection of daily high temperatures. Your program should count and print the number of hot days (high temperature 85 or greater), the number of pleasant days (high temperature 60-84), and the number of cold days (high temperature less than 60). Test your program with the following array of temperature values.

55 62 68 74 59 45 41 58 60 67

65 78 82 88 91 92 90 93 87 80

78 79 72 68 61 59

1. An objective type test consists of 10 questions of multiple-choice type. The correct answers are ‘B’,’C’,’A’,’D’,’A’,’B’,‘C’,’D’,’A’,’C’. A correct answer has 4 marks and a wrong answer has -1 mark. There is no mark if the question is unanswered. Write a program to read the answers of a candidate and print the score.
2. Create three arrays a1, a2, and a3 and accept values into a1 and a2 from the user. Do the following.
3. Compute the sum of a1 and a2.
4. Copy the contents of a1 in to another array a4.
5. Add the corresponding elements of a1 and a2 in to another array a5.
6. Reverse the contents of the array a3.
7. Write a program to read a three digit positive integer ‘n’ and generate possible permutation of numbers using their digits. For example: n=123, then permutations are 123, 132, 213, 231, 312, 321.
8. A magic square is a N x N matrix with each element being an integer from one to n-square and the sum of each row , column , and the two main diagonals being the same For example : A magic square of N=3

6 1 8

7 5 3

2 9 4

Write a C program to generate and print out a magic square for a given N, which

should be odd.

1. The results from the mayor’s race have been reported by each precinct (district) as follows.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Precinct** | **Candidate A** | **Candidate B** | **Candidate C** | **Candidate D** |
| 1 | 192 | 48 | 206 | 37 |
| 2 | 147 | 90 | 312 | 21 |
| 3 | 186 | 12 | 121 | 38 |
| 4 | 114 | 21 | 408 | 39 |
| 5 | 267 | 13 | 382 | 29 |

Write a program to do the following.

1. Compute and display the total number of votes received by each candidate and the percentage of the total votes cast.
2. For the candidate having the highest percentage, the program should display a message declaring that candidate as winner.
3. Write a program that computes the daily and weekly production totals. The employee names and the daily production output are the inputs. Compute the daily and weekly production totals as given in the example below.

**Emp Name Mon Tue Wed Thu Fri** **Totals**

Melisa 15 17 14 20 19 **85**

Jason 16 16 15 17 18 **82**

Nanci 25 23 24 20 18 **110**

**Totals**  **56 56 53 57 55**

**Arrays and strings**

1. Write an interactive C program that will encode or decode a line of text. To encode a line of text, proceed as follows.
2. Convert each character, including blank spaces, to its ASCII equivalent.
3. Enter a positive number. Add this integer to the ASCII equivalent of each Character.
4. The same integer will be used for the entire line of text.
5. Display the characters that correspond to the encoded ASCII values.

Decode the string using the same process in reverse.

1. Write a program that simulates the search and replaces operation in a text editor. The first function prompts the user to type a string of less than 80 characters. It then prompts the user to type the search substring of 10 or fewer characters. Finally it prompts the user to type the replace substring of 10 or fewer characters.
2. Write a program that takes the names of a person as input and prints the first letter of the first name and middle name(if any),and the title. for example : Raj Kumar Santhosi as R K Santhosi. Also the program should print the name in an abbreviated fashion. For example: the above name as RKS.
3. Write and test a function that finds the longest common prefix of two words. For example: The longest common prefix of “global” and “glossary” is “glo”, of “department” and “depart” is “depart”, and of “glove” and “dove” is the empty string.
4. Write a program that takes nouns and forms their plurals on the basis of these rules:
5. If the noun ends in “y”, then remove the “y” and add “ies”.
6. If the noun ends in “s”, “ch”, or “sh” add “es”.
7. In all other cases, just add “s”.

Print each noun and its plural. Try the following data.

Chair dairy boss fly dog church clue dish