

**Programming Fundamentals**

**SECTION-A**

|  |  |
| --- | --- |
| Lab 12 | |
| **Topic** | Pointers |
| **Objective** | * Hands on practice with pointers * Pointers with arrays * Pointers with functions |

**Question No: 01**

Write a C++ program to declare and initialize an integer type array with 10 elements. Print all elements of the array using a pointer to this array. You cannot use subscripting method of array i.e. array[i]

**Sample Output**

|  |
| --- |
| **Array:**  **10, 20, 30, 32, 56, 87, 12, 4, 117, 193** |

**Question No: 02**

Write a C++ program and declare an integer array with 50 elements. Array should be populated with random function and all values should be in range 50 to 99. Write a function which takes a pointer to this array and prints cube of each value in the array. Use de-referencing

of pointer to access array values.

**Sample Output**

|  |
| --- |
| **Sr. No. Value Cube**  1 55 3025  2 66 4356  3 88 7744  . .  . .  .  50 54 2916 |

**Question No: 03**

Write a C++ program and store a string in character type array i.e. Pakistan. Read string from user at run time. Write down a function and pass a pointer to this array to the function. This function should print string in reverse using pointer.

**Sample Output**

|  |
| --- |
| **Enter String:** ProgrammingFundamentals  **Output:** slatnemadnuFgnimmargorP |

**Question No: 04**

Write a C++ program and ask user to enter marks of 4 subjects including English, Urdu, Mathematics and GeneralScience. Write a function ‘performanceCalculator()’ which takes pointers to marks of these subject as parameters. Then, calculates grade of each subject, CGPA of student.

Now, print all these grades and CGPA of student in Main Function.

*CGPA Criteria:*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Marks** | >=85 | >=80 | >=75 | >=70 | >=65 | >=60 | <60 |
| **Grade** | 4.00 (A) | 3.70 (B+) | 3.30 (B) | 3.0  (C) | 2.5  (D) | 2.0  (E) | 0.0  (F) |

**Sample Output**

|  |
| --- |
| **Enter marks of English:** 91  **Enter marks of Urdu:** 85  **Enter marks of Mathematics:** 96  **Enter marks of GeneralScience:** 87  **Progress:**  English**: A,** Urdu**: A,** Mathematics**: A,** GeneralScience**: A**  CGPA**: 4.0** |

**Question No: 05**

Write a C++ Program which display the even index values of an integer array of size 100 using pointers. You need to populate the array using random function. Values should be in between X and Y. where, X and Y are to be taken from user at run time.

**Sample Output**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Enter Value for X: 15**  **Enter Value for Y: 175**  **Array:**  **0 1 2 3 4 . . . 98 99**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **156** | **44** | **21** | **121** | **74** |  |  | **123** | **29** |   **Output:**  **21, 74, . . . , 123** |

**Question No: 06**

Write a C++ program where a pointer is pointing to an integer type variable. Apply the following operation on this pointer:

* Increment operation (e.g. ptr++, ++ptr)
* Decrement operation (e.g. ptr--, --ptr)
* Increment and decrement on dereferenced pointer (++(\*ptr), (\*ptr)-- )
* Add N in pointer and display pointer address and its value (where, N is any integer value less than 10)
* Subtract N from pointer and display pointer address and its value

**Question No: 07**

Write a C++ program which reads integer data from a text file named “Input.txt” and store all data items in an array. Now double (2x) each value in array using pointer to each individual value and rewrite this data into same file.

**Sample Output**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input.txt**   |  |  | | --- | --- | | **Before** | **After** | | 12  43  21  65  33  10  8  170  220 | 24  86  42  130  66  20  16  340  440 | |