National University

Of Computer & Emerging Sciences Peshawar Campus

CL-210 Data Structures
Lab # 2

Objectives:

- Pointers
- Pointer to Function
- DMA

Note: Carefully read the following instructions (*Each instruction contains a weightage*)

1. There must be a block of comments at start of every question's code by students; the block should contain brief description about functionality of code.
2. Comment on every function and about its functionality.
3. Mention comments where necessary such as comments with variables, loop, classes etc to increase code understandability.
4. Use understandable name of variables.
5. Proper indentation of code is essential.
6. Write a code in C++ language.
7. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of every task **outputs in Microsoft Word and submit word file.**
8. First think about statement problems and then write/draw your logic on copy.
9. After copy pencil work, code the problem statement on MS Studio C++ compiler.
10. At the end when you done your tasks, attached C++ created files in MS word file and make your submission on Google Classroom. (Make sure your submission is completed).
11. Please submit your file in this format **19F1234_L1**.
12. Do not submit your assignment after deadline. Late and email submission is not accepted.
13. Do not copy code from any source otherwise you will be penalized with negative marks.

Problem: 1 |

Write a program that places a developer check on arrays index out of bound i.e. it checks during insertion that the index is not less than zero or greater than the mentioned size..

Problem: 2 |

Find the error in each of the following segments. If the error can be corrected, explain how.

a) int *number;
   cout << number << endl;
b) double *realPtr;
   long *integerPtr;
   integerPtr = realPtr;
c) int * x, y;
   x = y;
d) char s[] = "this is a character array";
   for (;*s != '\0'; ++s)
   cout << *s << ' ';
e) short *numPtr,
   result; void *genericPtr = numPtr;
   result = *genericPtr + 7;
f) double x = 19.34;
   double xPtr = &x;
   cout << xPtr << endl;

Problem: 3 |

What does these programs do?

Part a)

```
#include <iostream>
using namespace std;

 void mystery1(char*, const char*); // prototype

 int main()
 {
       char string1[80];
       char string2[80];

       cout << "Enter two strings: ";
       cin >> string1 >> string2;
       mystery1(string1, string2);
       cout << string1 << endl;
        } // end main
```

```
// What does this function do?
void mystery1(char* s1, const char* s2)
{
      while (*s1 != '\0')
            ++s1;

      for (; *s1 = *s2; ++s1, ++s2)
            ; // empty statement
       } // end function mystery1
```

Part b)

```
#include <iostream>
 using namespace std;

 int mystery2(const char*); // prototype
 int main()
 {
        char string1[80];

       cout << "Enter a string: ";
       cin >> string1;
       cout << mystery2(string1) << endl;
       } // end main

 // What does this function do?
 int mystery2(const char* s)
 {
        int x;
        for (x = 0; *s != '\0'; ++s)
              ++x;
        return x;
        } // end function mystery2
```

Problem: 4 |

Explain the prefix and postfix pointers with proper and reasonable comments on each statement about the working of pointers.

```
#include<iostream>
#include<conio.h>
using namespace std;
int main()
{
       int a = 5, b = 10;
       int c;
       int* p1, * p2;
       p1 = &a;
       p2 = &b;
       c = *p1;
       cout << "*(p1++) =" << *(p1++) << endl;
       cout << "value of p1 " << p1 << endl;
       cout << "*(++p1) =" << *(++p1) << endl;
```

```
        cout << "value of p1 " << p1 << endl;
        cout << "(*p1)++ =" << (*p1)++ << endl;
        cout << "value of p1 " << p1 << endl;
        cout << "++(*p1) =" << ++(*p1) << endl;
        cout << "value of p1 " << p1 << endl;
        return 0;
}
```

Problem: 5 |

Write a program which declares a variable of character type named alpha and assign it the value "Y". Now perform the tasks mentioned below:

1. Declare a **pointer pointing to the constant character** and pass the address of alpha in it. Now change the value of alpha to Z using this pointer. See what output you expect?

2. Declare a **constant pointer to the character** and pass the address of alpha in it. Now declare another character variable named bravo and assign it value M. Now try to pass address of bravo to the same constant pointer and see what happens?

3. Declare a **constant pointer to the constant character** and pass the address of alpha in it. Now declare another character variable named bravo and assign it value M. Now try to pass address bravo to the same constant pointer .Try to modify the value of alpha too and also see what happens?

Problem: 6 |

Write a function using pointer notation that accepts following arguments; A pointer char array and Two integer that indicates the indexes (startIndex and stopIndex). Function will return a string which holds the section between the two indexes and Return the null if it's not possible.

Example:

Entered string is "My name is ali"

Start index: 3

Stop index: 6

Function will return "name"

 Best of luck