Jaypee University of Engineering and Technology, Guna

[LAB ACTIVITY 1]

DATA STRUCTURES(18B11CI311)

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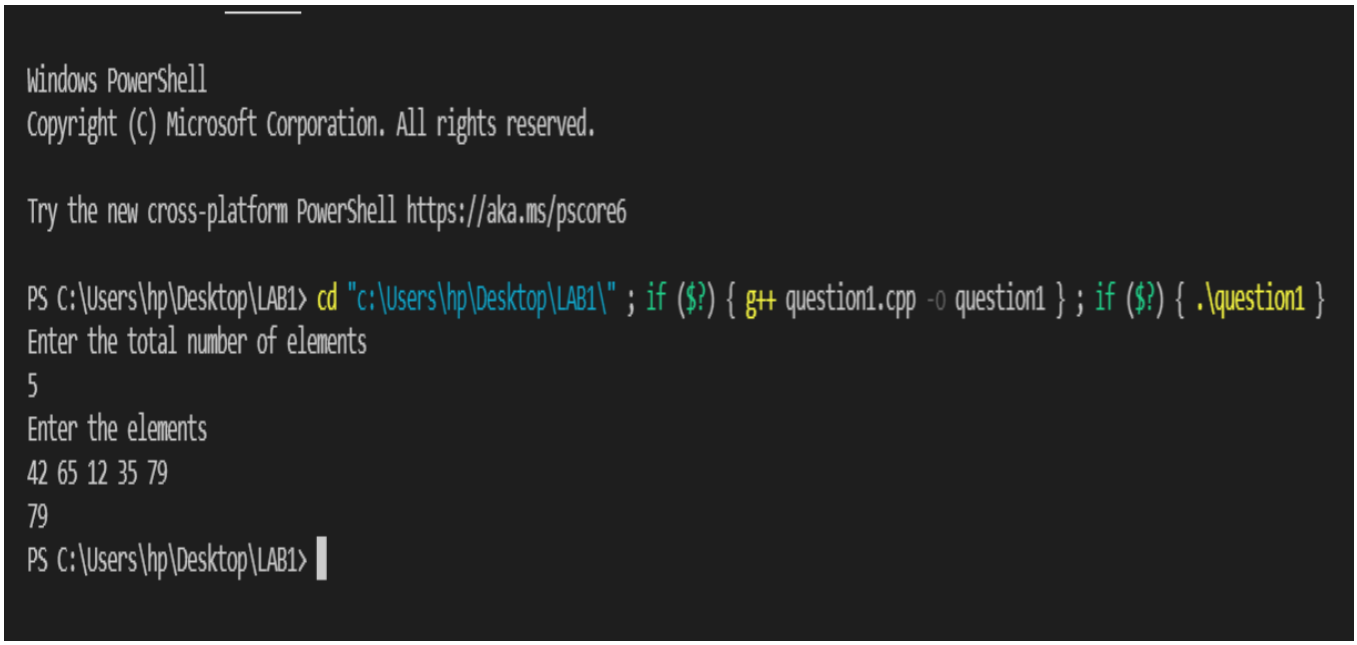
1. WAP to find out largest element of an array.

Solution:

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

int largest(int array[], int n){
    int max = array[0];
    for(int i=1;i<n;i++){
        if(max<array[i]){
            max=array[i];
        }
    }
    return max;
}
int main(){
    int n,max=0;
```

```
    cout<<"Enter the total number of
elements"<<endl;
    cin>>n;
    int array[n];
    cout<<"Enter the elements"<<endl;
    for(int i=0;i<n;i++){
        cin>>array[i];
    }
    cout<<largest(array,n)<<endl;
}
```



2. WAP to search an element in array.

Solution:

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

int search(int array[],int n,int number){
    for(int i=0;i<n;i++){
        if(array[i]==number){
            return i;
        }
    }
    return -1;
}

int main(){
    int n,result;
```

```
    cout<<"Enter the number of
elements"<<endl;
    cin>>n;           //no. of elements
    int array[n];
    cout<<"Enter the elements"<<endl;
    for(int i=0;i<n;i++){
        cin>>array[i];
    }
    int number;
    cout<<"Enter the element to be
found"<<endl;
    cin>>number;
    result=search(array,n,number);
    if(result == -1){
        cout<<"Element not found"<<endl;
    }
    else{
        cout<<"Element found at index no.
"<<result<<endl;
```

```
    }

}
```

```
Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\hp\Desktop\LAB1> cd "c:\Users\hp\Desktop\LAB1\" ; if ($?) { g++ question2.cpp -o question2 } ; if ($?) { .\question2 }
Enter the number of elements
5
Enter the elements
16
48
36
95
72
Enter the element to be found
36
Element found at index no. 2
PS C:\Users\hp\Desktop\LAB1>
```

3. WAP to check whether the number is prime or not.

Solution:

```
#include <iostream>

using namespace std;

int main()
{int n;
cout<<" enter the number to be
checked"<<endl;
cin>>n;
for(int i=2;i<n;i++)
{
   if((n%i)==0)
   {cout<<"not a prime"<<endl;
   break;
   }
   if(i==n)
   {
      cout<<"prime"<<endl;
   }
```

```
    }
        return 0;
    }
```

```
Windows PowerShell
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PS C:\Users\hp\Desktop\LAB1> cd "c:\Users\hp\Desktop\LAB1\" ; if ($?) { g++ question3.cpp -o question3 } ; if ($?) { .\question3 }
 enter the number to be checked
54
not a prime
PS C:\Users\hp\Desktop\LAB1>
```

4. WAP to calculate x^y where x and y are two integer numbers entered by the user. [do not use pow() function].

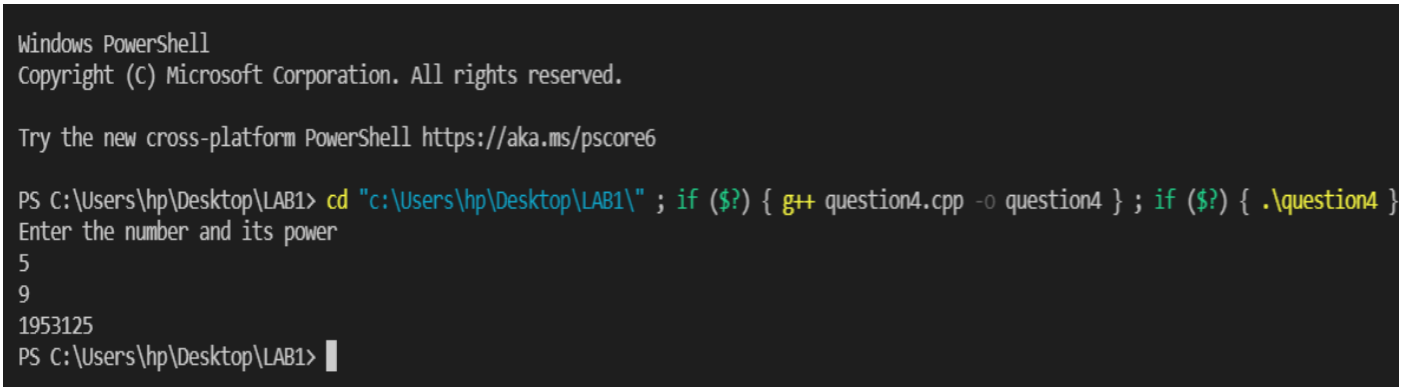
   Solution:

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

int power(int x, int y)
{
    if (y == 0)
    {
        return 1;
    }
    else{
        return (x * power(x,y-1));
    }
}

int main()
{
    int x, y, result;
```

```
    cout << "Enter the number and its power"
<< endl;
    cin >> x >> y;
    result = power(x, y);
    cout << result << endl;
    return 0;
}
```



5. WAP to replace a character by another character in a string. Take both the choices from the user.

Solution:

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

int char_replace(string &str,char c1,char c2){
    for(int i=0;str[i] !='\0';i++){
        if(str[i] == c1){
            str[i]=c2;
            break;
        }
    }
    cout<<str<<endl;
}

int main(){
    string str;
    char c1,c2;
```

```
    cout<<"Enter the string"<<endl;
    cin>>str;
    cout<<"Enter the character to be
replaced"<<endl;
    cin>>c1;
    cout<<"Enter the character to be replaced
with"<<endl;
    cin>>c2;
    char_replace(str,c1,c2);
    return 0;
}
```

```
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PS C:\Users\hp\Desktop\LAB1> cd "c:\Users\hp\Desktop\LAB1\" ; if ($?) { g++ question5.cpp -o question5 } ; if ($?) { .\question5 }
Enter the string
palash
Enter the character to be replaced
s
Enter the character to be replaced with
J
palaJh
PS C:\Users\hp\Desktop\LAB1>
```

6. WAP to find the reverse of given string.

Solution:

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main(){
   char string[20],temp;
   int i,length;
   printf("Enter String : ");
   scanf("%s",string);
   length=strlen(string)-1;
   for(i=0;i<strlen(string)/2;i++){
      temp=string[i];
      string[i]=string[length];
      string[length--]=temp;
   }
   printf("\nReverse string :%s",string);
   getch();
}
```

```
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PS C:\Users\hp\Desktop\LAB1> cd "c:\Users\hp\Desktop\LAB1\" ; if ($?) { gcc question6.c -o question6 } ; if ($?) { .\question6 }
Enter String : palash

Reverse string :hsalap
```

7. WAP to sort the array and ask the choice from user for ascending/descending.

Solution:

```
#include <iostream>
using namespace std;
void Asc_Desc(int array[],char ch,int size)
{ int temp;
   switch (ch)
   {
   case 1:
      for (int i = 0; i < size; i++)
      {
         for (int j = 0; j < size - 1; j++)
         {
            if (array[j] > array[j + 1])
            {
               temp = array[j];
               array[j] = array[j + 1];
               array[j + 1] = temp;
            }
         }
```

```
        }
        for (int i = 0; i < size; i++)
        {
            cout << array[i] << " ";
        }
        break;
    case 2:
        for (int i = 0; i < size; i++)
        {
            for (int j = 0; j < size - 1; j++)
            {
                if (array[j] < array[j + 1])
                {
                    temp = array[j];
                    array[j] = array[j + 1];
                    array[j + 1] = temp;
                }
            }
        }
        for (int i = 0; i < size; i++)
        {
            cout << array[i] << " ";
        }
```

```
        break;
    default:
        cout << "Error 404 \n";
        break;
    }
}
int main()
{
    int size, ch;
    cout << "Enter size\n";
    cin >> size;
    int array[size];
    cout<<”enter elements\n”;
    for (int i = 0; i < size; i++)
    {
        cin >> array[i];
    }
    cout << "Enter your choice\n Press 1 for
Ascending \n Press 2 for Descending\n";
    cin >> ch;
    Asc_Desc(array,ch,size);
    return 0;
}
```

```
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PS C:\Users\hp\Desktop\LAB1> cd "c:\Users\hp\Desktop\LAB1\" ; if ($?) { g++ question7.cpp -o question7 } ; if ($?) { .\question7 }
Enter size
5
Enter elements
10 30 50 15 3
Enter your choice
 Press 1 for Ascending
 Press 2 for Descending
1
3 10 15 30 50
PS C:\Users\hp\Desktop\LAB1>
```

8. WAP to find a word in given statement.

   Solution:

9. WAP to concatenate two strings using pointer.

   Solution:

```
#include<stdio.h>
#include<string.h>
void conc(char *,char *);
int main(){
    char str1[100],str2[50];
    puts("Enter the string");
    gets(str1);
    puts("Enter the string you want to
concatenate");
    gets(str2);
    conc(str1,str2);
    printf("String after concatenating is
%s",str1);
```

```
    return 0;
}
void conc(char *str1,char *str2){
    int i,k=0;

for(i=strlen(str1);i<=strlen(str1)+strlen(str2);
i++){
        str1[i]=str2[k++];
    }
    str1[i]='\0';
}
```

```
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PS C:\Users\hp\Desktop\LAB1> cd "c:\Users\hp\Desktop\LAB1\" ; if ($?) { g++ question8.cpp -o question8 } ; if ($?) { .\question8 }
Enter the string
Pal
Enter the string you want to concatenate
ash
String after concatenating is Palash
PS C:\Users\hp\Desktop\LAB1>
```

10. WAP to create a dynamic array of user desired size and search an element in that array.

Solution:

```
#include<iostream>
using namespace std;
int size_;
int searchx(int x,int *p)
{
    int i;
    for(i=0;i<size_;i++)
    {
        if(p[i]==x)
            return i;
    }
    return -1;
}
int main()
{
    int *p,x;
    cout<<"ENTER SIZE: ";
```

```
    cin>>size_;
    p=new int[size_];
    cout<<"ENTER ELEMENTS: \n";
    for(int i=0;i<size_;i++)
    {
        cin>>p[i];
    }
    cout<<"ENTER ELEMENT TO BE
SEARCHED: ";
    cin>>x;
    if(searchx(x,p)==-1)
        cout<<"\nNOT FOUND";
    else
        cout<<"\nELEMENT AT INDEX:
"<<searchx(x,p)+1;
    delete []p;
    return 0;
}
```

```
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PS C:\Users\hp\Desktop\LAB1> cd "c:\Users\hp\Desktop\LAB1\" ; if ($?) { g++ question9.cpp -o question9 } ; if ($?) { .\question9 }
ENTER SIZE: 5
ENTER ELEMENTS:
4 61 10 36 71
ENTER ELEMENT TO BE SEARCHED: 36

ELEMENT AT INDEX: 4
PS C:\Users\hp\Desktop\LAB1>
```

Advanced Problems:

11. WAP to calculate difference between two time periods using the C structures.

Solution:

```
#include <stdio.h>
struct TIME {
   int seconds;
   int minutes;
   int hours;
};

void differenceBetweenTimePeriod(struct TIME t1, struct TIME t2,struct TIME *diff);

int main() {
   struct TIME startTime, stopTime, diff;
```

```
    printf("Enter the start time. \n");
    printf("Enter hours, minutes and seconds: ");
    scanf("%d %d %d", &startTime.hours,
        &startTime.minutes,
        &startTime.seconds);

    printf("Enter the stop time. \n");
    printf("Enter hours, minutes and seconds: ");
    scanf("%d %d %d", &stopTime.hours,
        &stopTime.minutes,
        &stopTime.seconds);


    differenceBetweenTimePeriod(startTime,
stopTime, &diff);
    printf("\nTime Difference: %d:%d:%d - ",
startTime.hours,
         startTime.minutes,
         startTime.seconds);
```

```
    printf("%d:%d:%d ", stopTime.hours,
            stopTime.minutes,
            stopTime.seconds);
    printf("= %d:%d:%d\n", diff.hours,
            diff.minutes,
            diff.seconds);
    return 0;
  }


  void differenceBetweenTimePeriod(struct
TIME start, struct TIME stop, struct TIME *diff)
{
    while (stop.seconds > start.seconds) {
      --start.minutes;
      start.seconds += 60;
    }
    diff->seconds = start.seconds - stop.seconds;
    while (stop.minutes > start.minutes) {
```

```
    --start.hours;
    start.minutes += 60;
  }
  diff->minutes = start.minutes - stop.minutes;
  diff->hours = start.hours - stop.hours;
}
```

12. WAP to add two complex numbers by passing structure to a function.

Solution:

```
#include <stdio.h>
typedef struct complex {
    float real;
    float imag;
} complex;

complex add(complex n1, complex n2);

int main() {
    complex n1, n2, result;

    printf("For 1st complex number \n");
    printf("Enter the real and imaginary parts:
");
    scanf("%f %f", &n1.real, &n1.imag);
    printf("\nFor 2nd complex number \n");
    printf("Enter the real and imaginary parts:
");
```

```
    scanf("%f %f", &n2.real, &n2.imag);

    result = add(n1, n2);

    printf("Sum = %.1f + %.1fi", result.real,
result.imag);
    return 0;
}

complex add(complex n1, complex n2) {
    complex temp;
    temp.real = n1.real + n2.real;
    temp.imag = n1.imag + n2.imag;
    return (temp);
}
```

```
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PS C:\Users\hp\Desktop\LAB1> cd "c:\Users\hp\Desktop\LAB1\" ; if ($?) { g++ question11.cpp -o question11 } ; if ($?) { .\question11 }
For 1st complex number
Enter the real and imaginary parts: 45 93

For 2nd complex number
Enter the real and imaginary parts: 13 78
Sum = 58.0 + 171.0i
PS C:\Users\hp\Desktop\LAB1>
```