Assignment 15

Laboratory 10
Template Function and Template class

Example 1)

```cpp
#include <iostream>
using namespace std;
template <class T> void Swap(T & tmp1,T &tmp2){
    T temp;    temp=tmp1;    tmp1=tmp2;    tmp2=temp;    return;
}
int main(){
    int x=10,y=20;    double p=10.9,q=12.34;    char s='s',t='t';
    Swap(x,y);
    cout<<"X="<<x<<" and Y ="<<y<<endl;
    Swap(p,q);
    cout<<"P="<<p<<" and Q ="<<q<<endl;
     Swap(s,t);
    cout<<"S="<<s<<" and T ="<<t<<endl;
    char *m="hello",*n="Hi";
    Swap(m,n);
    cout<<"M = "<<m<<" and N = "<<n<<endl;
}
```

Example 2)

```cpp
#include<iostream>
#include<cstdlib>
using namespace std;
#define max 10
template<class T>
class stack{
    int top;    T a[max];    public:
    stack(){    top=-1;    }
    ~stack(){    }
    void push( T x){
        if(top==max-1){ cout<<"Stack overflow"<<endl;    exit(0);
        }
        else{    a[++top]=x;    }    }
T pop(){    T x;
    if(top==-1){    cout<<"Stack Underflow"<<endl;    exit(0);    }
    else{    x=a[top--]; }    return x;
}
```

```cpp
void show(){
    for(int i=0;i<=top;i++){        cout<<"a["<<i<<"]="<<a[i]<<endl;
    }}};
int main(){
    stack<float>s;    s.push(10.9);    s.push(23.8);    s.show();
    float x=s.pop();    cout<<"x="<<x<<endl;
}
```

```
shyam@shyam-HP-Laptop-15-da0xxx:~/Desktop/oopLAB/laboratory10/examples$ g++ 2.cpp -o 1
shyam@shyam-HP-Laptop-15-da0xxx:~/Desktop/oopLAB/laboratory10/examples$ ./1
a[0]=10.9
a[1]=23.8
x=23.8
shyam@shyam-HP-Laptop-15-da0xxx:~/Desktop/oopLAB/laboratory10/examples$ []
```

Program 1)

```cpp
#include<iostream>
#include<stdlib.h>
#define N 5
using namespace std;
template <class T>
T *alloc(T *a,T n){
    T *arr;
    arr=new T[n];
    for(int i=0;i<n;i++)
    arr[i]=a[i];
    return arr;
}
int main(){
    int *ptr,arr[N]={1,2,3,4,5};
    ptr=alloc(arr,N);
    for(int i=0;i<N;i++)
    cout<<" "<<ptr[i];
    cout<<endl;
    delete[]ptr;
}
```

```
shyam@shyam-HP-Laptop-15-da0xxx:~/Desktop/oopLAB/laboratory10/questions$ g++ 1.cpp -o 1
shyam@shyam-HP-Laptop-15-da0xxx:~/Desktop/oopLAB/laboratory10/questions$ ./1
 1 2 3 4 5
shyam@shyam-HP-Laptop-15-da0xxx:~/Desktop/oopLAB/laboratory10/questions$ █
```

Program 2

```cpp
#include<iostream>
using namespace std;
template <class T>
void descending(T *Arrange,int size){
```

```cpp
    T temp,flag; int i,j;
    for(i=0;i<size;i++){       flag=0;
        for(j=0;j<size;j++){           if(Arrange[j]<Arrange[j+1]){
                temp=Arrange[j];             Arrange[j]=Arrange[j+1];
                Arrange[j+1]=temp;              flag=1;
            }       }         if(flag==0)      break;   }   }
int main(){
    int i,arr[]={11,22,33,44,55};   descending(arr,5);
    char ch[]={'a','b','c','d','e'};   descending(ch,6);
    float f[]={1.1,2.2,3.3,4.4,5.5};
    descending(f,6);    for(i=0;i<5;i++){        cout<<" "<<arr[i];    }
    cout<<endl;    for(i=0;i<5;i++){        cout<<" "<<ch[i];    }
    cout<<endl;    for(i=0;i<5;i++){        cout<<" "<<f[i];    }
    cout<<endl;
}
```

```
shyam@shyam-HP-Laptop-15-da0xxx:~/Desktop/oopLAB/laboratory10/questions$ g++ 1.cpp -o 1
shyam@shyam-HP-Laptop-15-da0xxx:~/Desktop/oopLAB/laboratory10/questions$ ./1
55 44 33 22 11
e d c b a
5.5 4.4 3.3 2.2 1.1
```

Program 3

```cpp
#include<iostream>
using namespace std;
template <typename all>
all find_min(all*arr,int size){   all val; val=arr[0];
    for(int i=1;i<size;i++){       if(arr[i]<val)       val=arr[i];    }
    return val;}
template <typename all>
all find_max(all*arr,int size){
    all val; val=arr[0];
    for(int i=1;i<size;i++){ if(arr[i]>val)  val=arr[i]; }  return val;
}
int main(){
    int Arr[]={11,1,3,6,4,7,5,8,9,0};
    char ch[]={'A','B','C','D','E','F','G','H','I','J'};
    double db[]={1.1,2.2,3.3,4.4,5.5,6.6,7.7,8.8,9.9,1.2};
    cout<<"Min integer is "<<find_min(Arr,10)<<endl;
    cout<<"Max integer is "<<find_max(Arr,10)<<endl;
    cout<<"Min char is "<<find_min(ch,10)<<endl;
    cout<<"Max char is "<<find_max(ch,10)<<endl;
    cout<<"Min double is "<<find_min(db,10)<<endl;
    cout<<"Max double is "<<find_max(db,10)<<endl;
}
```

Program 4

```cpp
#include<iostream>
using namespace std;
template <class T>
void binary(T num){
    T rem[16];
    int i=0;
    cout<<"Decimal number is "<<num<<endl;
    while(num!=0){
        rem[i]=num%2;
        num=num/2;
        i++;
    }
    cout<<"Its binary is :";
    while(i>0){ cout<<" "<<rem[--i];     }
    cout<<endl;
}
int main(){
    binary(100);
}
```