Lab 8

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Question1:

Code:

```
#include<iostream>
using namespace std;
template<typename T>
void swap(T* a,T* b)
{
   cout<<"Before swap :  "<<*a<<" and "<<*b<<endl;
   T t;
   t = *a;
   *a = *b;
   *b = t;
   cout<<"After swap : "<<*a<<" and "<<*b<<endl;
}
int main()
{
int choice;
cout << "===========TYPES===========\n";
cout<<"1.int\n2.double\n3.char\n";
cout << "=========================\n";
cout<<"Enter choice of your datatype : ";
cin>>choice;
switch(choice)
{
   case 1:
   {
      int a,b;
      cout<<"Enter two numbers you want to swap\n";
      cout << "First one : ";
      cin >> a;
      cout << "Second one : ";
      cin>>b;
      swap<int>(&a,&b);
      break;
   }
   case 2:
   {
      double a,b;
      cout<<"Enter two double type you want to swap\n";
      cout << "First one : ";
      cin>>a;
      cout << "Second one : ";
      cin>>b;
      swap<double>(&a,&b);
      break;
      }case 3:
      {
         char a,b;
         cout<<"Enter 2 characters you want to swap\n";
         cout << "First one : ";
         cin>>a;
         cout << "Second one : ";
         cin>>b;
         swap<char>(&a,&b);
         break;
      }
   }
   return 0;
}
```

Input & output:

```
PS C:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8> cd "c:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8\" ; if ($?) { g++ 1.cpp -o 1 } ; if ($?) { .\1 }
==========TYPES==========
1.int
2.double
3.char
=========================
Enter choice of your datatype : 1
Enter two numbers you want to swap
First one : 8 26
Second one : Before swap :  8 and 26
After swap : 26 and 8
PS C:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8> cd "c:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8\" ; if ($?) { g++ 1.cpp -o 1 } ; if ($?) { .\1 }
==========TYPES==========
1.int
2.double
3.char
=========================
Enter choice of your datatype : 2
Enter two double type you want to swap
First one : 1.256
Second one : 2.256
Before swap :  1.256 and 2.256
After swap : 2.256 and 1.256
PS C:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8> cd "c:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8\" ; if ($?) { g++ 1.cpp -o 1 } ; if ($?) { .\1 }
==========TYPES==========
1.int
2.double
3.char
=========================
Enter choice of your datatype : 3
Enter 2 characters you want to swap
First one : A
Second one : Z
Before swap :  A and Z
After swap : Z and A
PS C:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8>
```

Question2:

Code:

```
#include<bits/stdc++.h>
using namespace std;
template<class T>
void exception_h()
{
   string sentence;
   cout<<"Enter a string : ";
   cin>>sentence;

   T i=0 ;
   T last = sentence[0];
   while(sentence[i]!='\0')
   {

      try{
            if(sentence[i]=='!'||
sentence[i]=='#'||sentence[i]=='&'||sentence[i]==1||sentence[i]==2||sentence[i]==3||sentence[i]==4||sentence[i]==5||sentence[i]==6||sentence[i]==7|
|sentence[i]==8||sentence[i]==9)
               {
                  throw sentence[i];
               }
               else {
                  if(sentence[i]>last)
                  {
                     last = sentence[i];
                  }
               }
      }
      catch (...)
      {
         cout<<"Expection Caught!!! unwanted characted are used..\n";
      }
      i++;
   }
   cout<<"Alphabetically last character is : "<<char(last)<<endl;
}
int main()
{
   exception_h<int>();

   return 0;
}
```

Input & output:

```
PS C:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8> cd "c:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8\" ; if ($?) { g++ 2.cpp -o 2 } ; if ($?) { .\2 }

Enter a string : HiEveryOne
Alphabetically last character is : y
PS C:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8>
```

Question3:

Code:

```
#include <bits/stdc++.h>
using namespace std;

int main()
{
   //division with zero
   int a = 2;
   int b = 2;
   int c = 5;
   try
   {
      if(a-b != 0){
         float d = c / (a-b);
      }
      else{
         throw (a-b);
      }
   }
   catch (int x){
      cout << "\nException caught for (a-b)" << endl;
   }
   //square root of negative number
   int t = -2;
   try{
      if(t > 0){
         float e = sqrt(t);
      }
      else{
         throw t;
      }
   }
   catch (int y){
      cout << "\nException caught for t\n" << endl;
   }
   return 0;
}
```

Input & output:

```
PS C:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8> cd "c:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8\" ; if ($?) { g++ 3.cpp -o 3 } ; if ($?) { .\3 }

Exception caught for (a-b)

Exception caught for t

PS C:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8>
```

Question4:

Code:

```
#include<iostream>
using namespace std;
template<class T>
class Stack{
   int top;
   int top_most;
   T *S;
   public:
        Stack(int max_size);
        ~Stack(){
           delete[] S;
        }
        int is_empty()const{
           return top==-1;
        }
        int is_full()const{
           return top==top_most;
        }
        T peek()const;
        void push(T);
        T pop();
        void display();
};

template<class T>
Stack<T>::Stack(int max_size)
{
      top_most=max_size-1;
      S=new T[max_size];
      top=-1;
}

template<class T>
T Stack<T>::peek()const
{
      if(is_empty())
         return 0;
      else
         return S[top];
}

template<class T>
void Stack<T>::push(T x)
{
      if(is_full())
         cout<<"Stack is full\n";
      else
      {
         S[++top]=x;
      }
}

template<class T>
T Stack<T>::pop()
{
      T x;
      if(is_empty())
      {
         cout<<"Stack is empty\n";
         return -1;
      }
      else
      {
         x=S[top--];
         return x;
      }
}

template<class T>
void Stack<T>::display()
{
      if(is_empty())
```

```
            cout<<"Out of bounds";
        else
            cout << "Elements of stack : ";
            for(int i=top;i>=0;i--)
            {
               cout<<S[i]<<" ";
            }
            cout << "\n";
}

int main()
{
   Stack<int>obj(5);
   int ch,x;

   cout << "===========MENU==========\n";
   cout<<"1.push\n2.pop\n3.peek\n4.display\n5.Exit\n";
   cout << "=========================\n";

   while(1){
      cout<<"\nEnter the choice : ";
      cin>>ch;
      switch(ch){
         case 1:
            cout<<"Enter a value to push into the stack : ";
            cin>>x;
            obj.push(x);
            break;
         case 2:
            x=obj.pop();
            if(x!=-1)
                  cout<<"Poped value is : "<<x<<endl;
            break;
         case 3:
            x=obj.peek();
            cout<<"Top most value is : "<<x<<endl;
            break;
         case 4:
            obj.display();
            break;
         case 5:
            return 0;
            break;
         default:
            cout << "Enter valid choice...!\n";
            break;
      }
   }
return 0;
}
```

Input & output:

```
PS C:\Users\DELL\OneDrive\Desktop\Labs> cd "c:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8\" ; if ($?) { g++ 4.cpp -o 4 } ; if ($?) { .\4 }
==========MENU==========
1.push
2.pop
3.peek
4.display
5.Exit
========================

Enter the choice : 1
Enter a value to push into the stack : 2

Enter the choice : 1
Enter a value to push into the stack : 4

Enter the choice : 1
Enter a value to push into the stack : 6

Enter the choice : 1
Enter a value to push into the stack : 8

Enter the choice : 2
Poped value is : 8

Enter the choice : 3
Top most value is : 6

Enter the choice : 4
Elements of stack : 6 4 2

Enter the choice : 5
PS C:\Users\DELL\OneDrive\Desktop\Labs\OOPM LAB\LAB 8>
```