

Heaven's Light is Our Guide
Rajshahi University of Engineering & Technology
Department of Computer Science & Engineering

Lab Manual

Course Code: **CSE 1204 (Sec A)**
Course Title: Sessional based on CSE 1203
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Module 5 [Advanced Topics]: (for Week 7)

Topic 1[Exception Handling]

Problem Statement: In the following input *i* is the index of array *ax[]*. The program prints *ax[i]*. Then write catch block if *i* is out of range of *ax[]*. Write three catch blocks to fulfill the purpose

- i) a catch block receives the value of *i*
- ii) a catch block receives string "Out of Range Error"
- iii) a default catch() if above two catch block doesn't match

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

int main()
{
    int i;
    int ax[5]={10,20,60,40,30};
    cout<<"enter index:";
    cin>>i;
    cout<<"ax["<<i<<"]="<<ax[i]<<endl;
}
```

Topic 2 [class Template]:

Problem Statement: In the following class data members *x* and *y* are integers and the method *Sum()* adds *x* and *y*. However, we need to perform the sum of *int+int*, *int+double*, *double+int* and *double+double*. To achieve it, change the definition of *x,y,setData()* and *Sum()* accordingly.

```
class A{
private:
    int x;
    int y;
public:
    void setData(int x,int y){
        this->x=x;
        this->y=y;
    }
    int Sum(){
        int s;
        s=x+y;
        return s;
    }
};

int main(){
    //write required statements to call SetData() & Sum()
}
```

Topic 3 [STL:Array class]

Problem statement: Declare a STL array object ax with 6 elements and do the following:

- i) Assign 10,60,30,70,20 to ax using single statement
- ii) Print third element of ax using at() function
- iii) Print first element of ax using front() function
- iv) Print last element of ax using back() function
- v) Fill the elements of ax using fill() function
- vi) Test whether ax is empty or not using empty() function
- vii) Print size of ax
- viii) Print maximum size of ax using max_size() function
- ix) Print address of first element of ax using begin() function
- x) Print address of last element of ax using end() function

```
#include <iostream>
#include <bits/stdc++.h>
using namespace std;
int main(){
    array<int,6>ax;
    //write statements
}
```

Topic 4[STL: pair class]

Problem statement: Define a pair class object px with int and string elements. Write statements to do the following

- i) Assign 10 to int and "Rajshahi" to px using make_pair() function
- ii) Print int data member by first
- iii) Print string data member by second
- iv) Modify first data member to 20 using get<>() function
- v) Declare another pair bx and assign values to bx and swap it with ax

```
#include <iostream>
#include <bits/stdc++.h>
using namespace std;
int main(){
    pair<int,string>px;
    //write statements
}
```

Topic 5 [STL: tuple class]

Problem statement: Define a tuple class object tx with int.string and double elements. Write statements to do the following

- i) Assign <100,"Kamal",3.5> to tx using make_tuple() function
- ii) Print int data member by get() function

- iii) Print string data member by get() function
- iv) Print double data member by get() function
- v) Modify third data member to 3.7 using get<>() function
- vi) Declare another tuple bx and assign values to bx and swap it with ax

```
#include <iostream>
#include <bits/stdc++.h>
using namespace std;
int main(){
    tuple<int,string,double>tx;
    //write statements
}
```

Topic 6 [STL: vector class]

Problem statement: Create a menu operated manipulation for linked list using vector class. Follow the following table for the details of each item of the following menu

Item	Functions
Insert	Insert a new element at first/last/after an existing element/before an existing element in the linked list ax
Delete	Delete an specific element input by the user from the linked list ax
Search	Search a specific element given by the user from ax
Display all	Display all the existing elements of the linked list ax

```
**** Main Menu ****
1. Insert
2. Delete
3. Search
4. Display list
5. Exit
Enter your option:
```

```
**** Insert Sub Menu ****
1. Insert at First
2. Insert at Last
3. Insert Before
4. Insert After
5. Exit
Enter your option:
```

```
#include <iostream>
#include <bits/stdc++.h>
using namespace std;
vector<int>ax;
//write functions
int main(){
    //write statements
}
```

Topic 7 [STL: stack class]

Problem statement: Write a program to create and manipulate Stack using stack class and Perform the following operations using the specified method.

- i) use `push()` method to push data
- ii) use `pop()` method to pop data
- iii) use `top()` method to display top element
- iv) use `empty()` method to check whether stack is empty or not

```
#include <iostream>
#include <bits/stdc++.h>
using namespace std;
int main(){
    stack<int>st;
    //write statements
}
```

Topic 8 [STL: queue class]

Problem statement: Write a program to create and manipulate Queue using queue class. Perform the following operations using the specified method.

- i) use `push()` method to push data
- ii) use `pop()` method to pop data
- iii) use `front()` method to display front element
- iv) use `back()` method to display rear element
- v) use `empty()` method to check whether queue is empty or not

```
#include <iostream>
#include <bits/stdc++.h>
using namespace std;
int main(){
    queue<int>qu;
    //write statements
}
```

Topic 9 [STL: list class]

Problem statement: Write a program to create and manipulate linked list using list class and its following methods to

- i) insert 8 integers using **`push_back()`** method
- ii) insert two elements using **`push_front()`** method
- iii) display all the elements of the list in forward direction with user-defined `Display()` method using **`begin()`** and **`end()`** methods and iterator

- iv) display all the elements of the list in reverse direction with a user-defined DisplayRev() method using **rbegin()** and **rend()** method and iterator
- v) display front element using **front()** method
- vi) display back element using **back()** method
- vii) delete front element using **pop_back()** method
- viii) delete front element using **pop_front()** method
- ix) search an element **x** using **find()** method
- x) insert a new element **x** before an existing element **y** using **insert()** method
- xi) insert a new element **x** after an existing element **y** using **insert()** method
- xii) count a particular element **x**
- xiii) count a elements with condition using predicate function
- xiv) delete a particular element **x** with **erase()** method
- xv) delete first 4 elements with **erase()** method
- xvi) delete a particular element **x** with **remove()** method
- xvii) delete a elements with condition using **remove_if()** method using predicate function
- xviii) assign elements from another list using **assign()** method
- xix) assign elements from an array using **assign()** method
- xx) sort the list using **sort()** method
- xxi) Delete consecutive similar elements using **unique()** method

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

int main(){
    list<int>li;
    //write statements
}
```