**LAB SHEET - 6**

TITLE: Dynamic memory allocation

Objective:

* To be familiar with dynamic memory allocation with C++.
* To be familiar with dynamic constructor and dynamic initialization of object.

1.**SOURCE CODE:**

#include <iostream>

using namespace std;

int main(){

int n,\*ptr, i;

cout<<"Enter the numbers that you like to input:"<<endl;

cin>>n;

ptr = new int[n];

for(i = 0; i<n; i++){

cout<<"Enter the number "<<i+1<<endl;

cin>>ptr[i];

}cout<<"The numbers you have entered are as follows:"<<endl;

for(i= 0; i<n; i++){

cout<<ptr[i]<<endl;

}

delete[] ptr;

return 0;

}

**OUTPUT:**

Enter the numbers that you like to input:

2

Enter the number 1

3

Enter the number 2

4

The numbers you have entered are as follows:

3

4

--------------------------------

Process exited after 10.59 seconds with return value 0

Press any key to continue . . .

**2.SOURCE CODE:**

#include<iostream>

using namespace std;

int main(){

int i, num[10], max;

cout<<"Enter the ten numbers:"<<endl;

int \*ptr;

ptr = new int[10];

//taking value from the users using DMA:

for(i=0; i<10; i++){

cin>>ptr[i];

}

max = ptr[0];

for(i=1; i<10; i++){

if(ptr[i]>max){

max = ptr[i];

}else{

max;

}

}

cout<<"The largest among the ten numbers is:"<<endl;

cout<<max<<endl;

delete[] ptr;

return 0;

}

**OUTPUT:**

Enter the ten numbers:

2

3

4

5

6

7

1

8

9

0

The largest among the ten numbers is:

9

--------------------------------

Process exited after 10.31 seconds with return value 0

Press any key to continue . . .

**3.SOURCE CODE**:

#include <iostream>

using namespace std;

int main(){

int n;

cout<<"How many numbers do you want to enter?"<<endl;

cin>>n;

int \*ptr, i, sum=0;

ptr = new int[n];

for(i=0; i<n; i++){

cout<<"Enter the value of number "<<i+1<<":"<<endl;

cin>>ptr[i];

sum=sum+ptr[i];

}

cout<<"The total sum of the numbers you entered is:"<<sum<<endl;

delete[] ptr;

return 0;

}

**OUTPUT:**

How many numbers do you want to enter?

3

Enter the value of number 1:

4

Enter the value of number 2:

2

Enter the value of number 3:

8

The total sum of the numbers you entered is:14

--------------------------------

Process exited after 8.569 seconds with return value 0

Press any key to continue . . .

**4.SOURCE CODE:**

#include<iostream>

using namespace std;

class student{

private:

int roll, m1, m2, m3;

char name[20];

public:

void getdata(){

cin>>name;

cout<<"Enter the roll number:"<<endl;

cin>>roll;

cout<<"Enter the marks of 3 subjects:"<<endl;

cin>>m1>>m2>>m3;

}

void display(){

cout<<"Name => "<<name<<endl;

cout<<"Roll no. => "<<roll<<endl;

if(m1>=45 && m2>=45 && m3>=45){

cout<<"PASS!!"<<endl;

}else {

cout<<"FAIL!!"<<endl;

}

}

};

int main(){

int n, i;

cout<<"Enter the number of students:"<<endl;

cin>>n;

student \*ptr;

char name[20];

ptr = new student[n];

for(i=0; i<n; i++){

cout<<"Enter name of the student "<<i+1<<":"<<endl;

ptr[i].getdata();

}

for(i=0; i<n; i++){

cout<<"The result of student "<<i+1<<":"<<endl;

ptr[i].display();

}

delete[] ptr;

return 0;

}

**OUTPUT:**

Enter the number of students:

2

Enter name of the student 1:

hasal

Enter the roll number:

4

Enter the marks of 3 subjects:

56

74

90

Enter name of the student 2:

sala

Enter the roll number:

34

Enter the marks of 3 subjects:

34

90

56

The result of student 1:

Name => hasal

Roll no. => 4

PASS!!

The result of student 2:

Name => sala

Roll no. => 34

FAIL!!

--------------------------------

Process exited after 44.19 seconds with return value 0

Press any key to continue . . .

**5.SOURCE CODE:**

#include <iostream>

using namespace std;

class complex{

private:

int \*real, \*imag;

public:

complex(int r, int i){

real = new int;

imag = new int;

\*real=r;

\*imag=i;

}

void addcomplex(complex c1, complex c2){

\*real= \*c1.real+ \*c2.real;

\*imag= \*c1.imag+ \*c2.imag;

}

void display(){

cout<<\*real<<"+"<<\*imag<<"i"<<endl;

}};

int main(){

complex c1(5,3);

complex c2(6,8);

cout<<"The first complex number is "<<endl;

c1.display();

cout<<"The second complex number is "<<endl;

c2.display();

cout<<"The sum of the given two complex number is "<<endl;

c2.addcomplex(c1,c2);

c2.display();

return 0;

}

**OUTPUT**

The first complex number is

5+3i

The second complex number is

6+8i

The sum of the given two complex number is

11+11i

--------------------------------

Process exited after 0.04654 seconds with return value 0

Press any key to continue . . .

**6.SOURCE CODE:**

#include<iostream>

using namespace std;

class Distance{

private:

int \*km, \*m;

public:

Distance(int k, int c){

km = new int;

m = new int;

\*km = k;

\*m = c;

}

adddistance(Distance d1, Distance d2){

\*m = \*d1.m + \*d2.m;

\*km = \*m / 1000;

\*m = \*m % 1000;

\*km = \*km + (\*d1.km + \*d2.km);

}

display(){

cout<<\*km<<"km "<<\*m<<"m"<<endl;

}

};

int main(){

Distance d1(6,743);

Distance d2(12,674);

cout<<"The first value of distance in km and m is:"<<endl;

d1.display();

cout<<"The second value of distance in km and m is:"<<endl;

d2.display();

cout<<"The sum of the given two distance is:"<<endl;

d2.adddistance(d1, d2);

d2.display();

return 0;

}

**OUTPUT**

The first value of distance in km and m is:

6km 743m

The second value of distance in km and m is:

12km 674m

The sum of the given two distance is:

8km 417m

--------------------------------

Process exited after 0.05074 seconds with return value 0

Press any key to continue . . .

#include<iostream>

using namespace std;

class height{

private:

int foot, inch;

public:

height(int f, int i){

foot = f;

inch = i;

}height(){

}

void addheight(height h1, height h2){

inch = h1.inch + h2.inch;

foot = inch/12;

inch = inch%12;

foot = foot + h1.foot + h2.foot;

cout<<foot<<"foot "<<inch<<"inch"<<endl;

}

};

int main(){

int f1, f2, i1, i2;

cout<<"Enter the first height:"<<endl;

cin>>f1>>i1;

cout<<"Enter the second height:"<<endl;

cin>>f2>>i2;

height h1(f1,i1);

height h2(f2,i2);

height h3;

cout<<"The sum of two heights is:"<<endl;

h3.addheight(h1,h2);

return 0;

}

**OUTPUT:**

Enter the first height:

6

7

Enter the second height:

3

6

The sum of two heights is:

10foot 1inch

--------------------------------

Process exited after 9.876 seconds with return value 0

Press any key to continue . . .

**DISCUSSION:**

We learnt about dynamic memory allocation and it’s syntax and we wrote some programs too. Also we became familiar with dynamic constructor and dynamic initialization of object in C++.