National University of Science and technology

(NUST)

CS-114 - Fundamental of Programing

Lab Manual # 10

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Date: 26/12/2023

TASK 1:

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

int main(){
	int input, x;
	vector<int> v;
	for(x=0; x<10; x++){
		cout<<"Enter a Value to Push into Vector's "<<x<<" index: ";
		cin>>input;
		v.push_back(input);
	}
	cout<<endl<<"Vector Currently Holding: ";
	for(x=0; x<10; x++)
	{

	cout<<v.at(x)<<", ";
	}

  v.erase(v.begin()+5);
	v.insert(v.begin()+5, 5);
	cout<<endl<<"Updated Vector: ";
		for(x=0; x<10; x++)
	{
	cout<<v.at(x)<<", ";
	}
```

}

Output:

```
Enter a Value to Push into Vector's 0 index: 2
Enter a Value to Push into Vector's 1 index: 54
Enter a Value to Push into Vector's 2 index: 6
Enter a Value to Push into Vector's 3 index: 4
Enter a Value to Push into Vector's 4 index: 765
Enter a Value to Push into Vector's 5 index: 7
Enter a Value to Push into Vector's 6 index: 87
Enter a Value to Push into Vector's 7 index: 123
Enter a Value to Push into Vector's 8 index: 23
Enter a Value to Push into Vector's 9 index: 5
Vector Currently Holding: 2, 54, 6, 4, 765, 7, 87, 123, 23, 5,
Updated Vector: 2, 54, 6, 4, 765, 5, 87, 123, 23, 5,
```

TASK 2:

```
#include<iostream>

#include<vector>

#include<string>

using namespace std;



int find_mean(vector<int> v){

        int sum=0, size=v.size();

        for(int x=0; x<v.size(); x++){

                sum=v[x]+sum;

        }

        int mean=sum/v.size();


        return mean;
```

```
}
int find_median(vector<int> v){
	int x, y, temp, median;
	for(x=0; x<v.size()-1; x++){
		for(y=0; y<v.size()-1; y++){
			if(v[y]>v[y+1]){
				temp=v[y];
				v[y]=v[y+1];
				v[y+1]=temp;
			}
		}
	}
	int n=v.size();
	if(n%2 == 0){
		median=((n/2)+((n/2)+1))/2;
	}
	else{
		median=(n+1)/2;

	}

	return v[median-1]	;
}

int find_mode(vector<int> v){
	int repetition=0, maxrep=0, mostrepeated;
	for(int x=0; x<v.size(); x++){
		repetition=0;
		for(int y=0; y<v.size(); y++){
```

```
                        if(v[x]==v[y]){
                                repetition++;
                        }
                }
                if(repetition>maxrep){
                        maxrep=repetition;
                        mostrepeated=v[x];
                }
        }
        return mostrepeated;
}

void students_mode(vector<string> v, vector<int> g, int mode){
        int x=0;
        cout<<"Students with Grade Equal to Mode: ";
        for(x=0; x<v.size(); x++){
                if(g[x]==mode){
                        cout<<v[x]<<endl;
                }
        }
}
int main(){
        vector<string> names;
        vector<int> grades;
        int x,y,input, num;
        string name;
        cout<<"Enter Number of Students to be Inputted: ";
        cin>>num;
        for(x=0; x<num; x++){
```

```
system("cls");
cout<<"Enter the Name of Student: ";
cin>>name;
names.push_back(name);
cout<<endl<<"Enter Grade of Student in Percentage: ";
cin>>input;
grades.push_back(input);
}
system("cls");
int mean=find_mean(grades);
cout<<endl<<"Mean is: "<<mean<<endl;
int median=find_median(grades);
cout<<"Median is: "<<median<<endl;
int mode=find_mode(grades);
cout<<"Mode is: "<<mode<<endl;
students_mode(names, grades, mode);

}
```

Output:

```
Enter Number of Students to be Inputted: 2
Enter the Name of Student: Hashir
Enter Grade of Student in Percentage: 76
Enter the Name of Student: Umar
Enter Grade of Student in Percentage: 65
Mean is: 70
Median is: 65
Mode is: 76
Students with Grade Equal to Mode: Hashir
```

TASK 3:

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

class triangle{
	public:
		int x=4;
		int y=5;
		int z=6;

	int perimeter(){
		return x+y+z;

	}
	double area(){
		int area,s;
		s=perimeter()/2;
		return sqrt(s * (s - x) * (s - y) * (s - z));
	}
};

int main(){
	triangle task3;
	int perimeter;
	double area;
	perimeter=task3.perimeter();
	area=task3.area();
```

```
        cout<<"Area is: "<<area<<endl;
        cout<<"Perimeter is: "<<perimeter<<endl;

}
```

Output:

```
Area is: 6.48074
Perimeter is: 15
```

TASK 4:

```
#include <iostream>
#include <string>

using namespace std;

struct Employee {
    string name;
    double salary;
    int hoursWorkedPerDay;
};

int main() {
    const int numEmployees = 10;
    Employee employees[numEmployees];

    for (int x = 0; x < numEmployees; ++x) {
        cout << "Enter name for employee " << x + 1 << ": ";
        cin >> employees[x].name;
```

```
        cout << "Enter salary for employee " << x + 1 << ": ";
        cin >> employees[x].salary;

        cout << "Enter hours of work per day for employee " << x + 1 << ": ";
        cin >> employees[x].hoursWorkedPerDay;

        cout << endl;
    }

    for (int x = 0; x < numEmployees; ++x) {
        if (employees[x].hoursWorkedPerDay >= 12) {
            employees[x].salary += 150;
        } else if (employees[x].hoursWorkedPerDay >= 10) {
            employees[x].salary += 100;
        } else if (employees[x].hoursWorkedPerDay >= 8) {
            employees[x].salary += 50;
        }
    }

    cout << "Employee Details:" << endl;
    for (int x = 0; x < numEmployees; ++x) {
        cout << "Name: " << employees[x].name << ", Final Salary: $" << employees[x].salary << endl;
    }

}
```

Output:

```
Enter name for employee 1: hasan
Enter salary for employee 1: 20
Enter hours of work per day for employee 1: 10
Enter name for employee 2: amajd
Enter salary for employee 2: 31
Enter hours of work per day for employee 2: 2
Enter name for employee 3: ali
Enter salary for employee 3: 9
Enter hours of work per day for employee 3: 40
Enter name for employee 4: hashir
Enter salary for employee 4: 50
Enter hours of work per day for employee 4: 8
Enter name for employee 5: asim
Enter salary for employee 5: 32
Enter hours of work per day for employee 5: 7
Enter name for employee 6: zia
Enter salary for employee 6: 12
Enter hours of work per day for employee 6: 25
Enter name for employee 7: ahmad
Enter salary for employee 7: 30
Enter hours of work per day for employee 7: 12
```

```
Enter name for employee 8: aslam
Enter salary for employee 8: 27
Enter hours of work per day for employee 8: 12
Enter name for employee 9: asad
Enter salary for employee 9: 25
Enter hours of work per day for employee 9: 11
Enter name for employee 10: ziad
Enter salary for employee 10: 31
Enter hours of work per day for employee 10: 10
Employee Details:
Name: hasan, Final Salary: $120
Name: amajd, Final Salary: $31
Name: ali, Final Salary: $159
Name: hashir, Final Salary: $100
Name: asim, Final Salary: $32
Name: zia, Final Salary: $162
Name: ahmad, Final Salary: $180
Name: aslam, Final Salary: $177
Name: asad, Final Salary: $125
Name: ziad, Final Salary: $131
```