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CS360L - Programming in C and C++ Lab
Lab Assignment #2

Q1.

main.cpp

Download Code

```cpp
#include <iostream>
using std::cout;
using std::cin;

#define MAX 3
class student {
private:
    char name[30];
    int courseNum;
    int total;
    float perc;
public:
    void getDetails(void);
    void putDetails(void);
};

void student::getDetails(void) {
    cout << "Enter name: ";
    cin >> name;
    cout << "Enter course number: ";
    cin >> courseNum;
    cout << "Enter total grades out of 500: ";
    cin >> total;
    perc = (float)total / 500 * 100;
}

void student::putDetails(void) {
    cout << "Student details:\n";
    cout << "Name: " << name << ", Course Number: " << courseNum
         << ", Total: " << total << ", Percentage: " << perc << "%\n";
}
```

```cpp
int main() {
    student students[MAX];

    for (int i = 0; i < MAX; ++i) {
        cout << "\nEnter details for student " << i + 1 << ":\n";
        students[i].getDetails();
    }

    cout << "\nDetails of students who appeared in the examination:\n";
    for (int i = 0; i < MAX; ++i) {
        cout << "\nDetails of student " << i + 1 << ":\n";
        students[i].putDetails();
    }

    return 0;
}
```

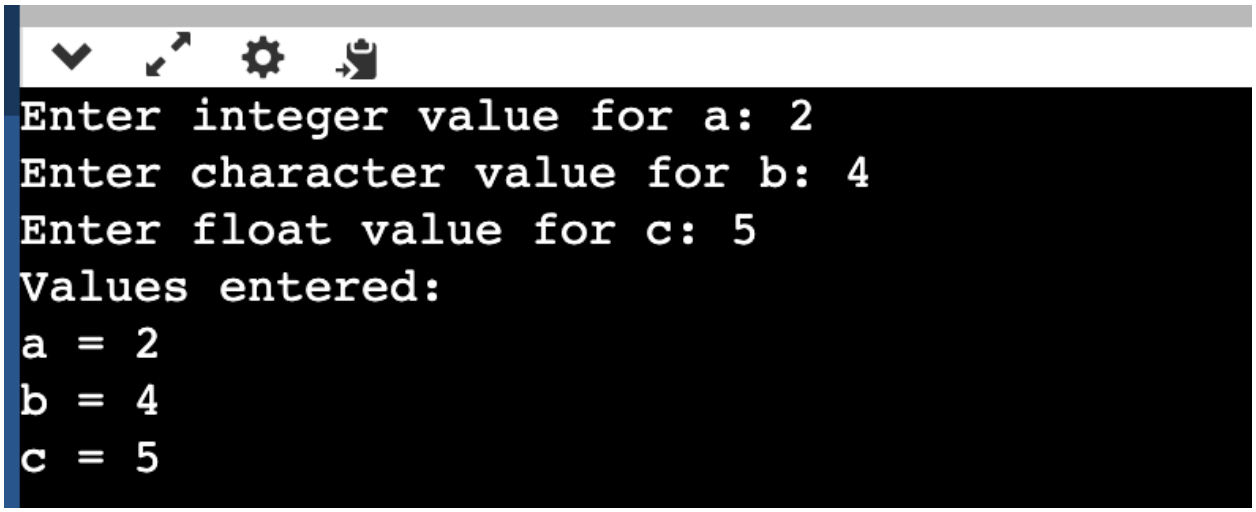
input

```
Enter details for student 1:
Enter name: Samir
Enter course number: 1001
Enter total grades out of 500: 499

Enter details for student 2:
Enter name: Ram
Enter course number: 1002
Enter total grades out of 500: 400

Enter details for student 3:
Enter name: John
Enter course number: 1003
Enter total grades out of 500: 350

Details of students who appeared in the examination:

Details of student 1:
Student details:
Name: Samir, Course Number: 1001, Total: 499, Percentage: 99.8%

Details of student 2:
Student details:
Name: Ram, Course Number: 1002, Total: 400, Percentage: 80%

Details of student 3:
Student details:
Name: John, Course Number: 1003, Total: 350, Percentage: 70%
```

Q2.

main.cpp

```cpp
#include<iostream>
using std::cout;
using std::cin;
using std::endl;

class sample{
private:
    int a;
    char b;
    float c;
public:
    void get_data(){
        cout << "Enter integer value for a: ";
        cin >> a;
        cout << "Enter character value for b: ";
        cin >> b;
        cout << "Enter float value for c: ";
        cin >> c;
    }

    void print_data(){
        cout << "Values entered:" << endl;
        cout << "a = " << a << endl;
        cout << "b = " << b << endl;
        cout << "c = " << c << endl;
    }
};

int main(void){
    sample s;
    s.get_data();
    s.print_data();
    return 0;
}

```


Enter integer value for a: 2
Enter character value for b: 4
Enter float value for c: 5
Values entered:
a = 2
b = 4
c = 5

Q3.

main.cpp

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

class Rectangle {
private:
    float length;
    float width;

public:
    void setLength(float len) {
        length = len;
    }

    void setWidth(float wid) {
        width = wid;
    }

    float perimeter() {
        return 2 * (length + width);
    }

    float area() {
        return length * width;
    }

    void show() {
        cout << "Length: " << length << ", Width: " << width << endl;
    }

    int sameArea(Rectangle r) {
        if (this->area() == r.area())
            return 1;
        else
            return 0;
    }
};

int main() {
    Rectangle rect1, rect2;

    rect1.setLength(5);
    rect1.setWidth(2.5);
```

```
    rect2.setLength(5);
    rect2.setWidth(18.9);

    cout << "Rectangle 1:" << endl;
    rect1.show();
    cout << "Area: " << rect1.area() << ", Perimeter: " << rect1.perimeter() << endl;

    cout << "\nRectangle 2:" << endl;
    rect2.show();
    cout << "Area: " << rect2.area() << ", Perimeter: " << rect2.perimeter() << endl;

    if (rect1.sameArea(rect2))
        cout << "\nBoth rectangles have the same area." << endl;
    else
        cout << "\nRectangles have different areas." << endl;

    rect1.setLength(15);
    rect1.setWidth(6.3);

    cout << "\nAfter updating dimensions for Rectangle 1:" << endl;
    cout << "Rectangle 1:" << endl;
    rect1.show();
    cout << "Area: " << rect1.area() << ", Perimeter: " << rect1.perimeter() << endl;

    cout << "\nRectangle 2:" << endl;
    rect2.show();
    cout << "Area: " << rect2.area() << ", Perimeter: " << rect2.perimeter() << endl;

    if (rect1.sameArea(rect2))
        cout << "\nBoth rectangles have the same area." << endl;
    else
        cout << "\nRectangles have different areas." << endl;

    return 0;
}
```

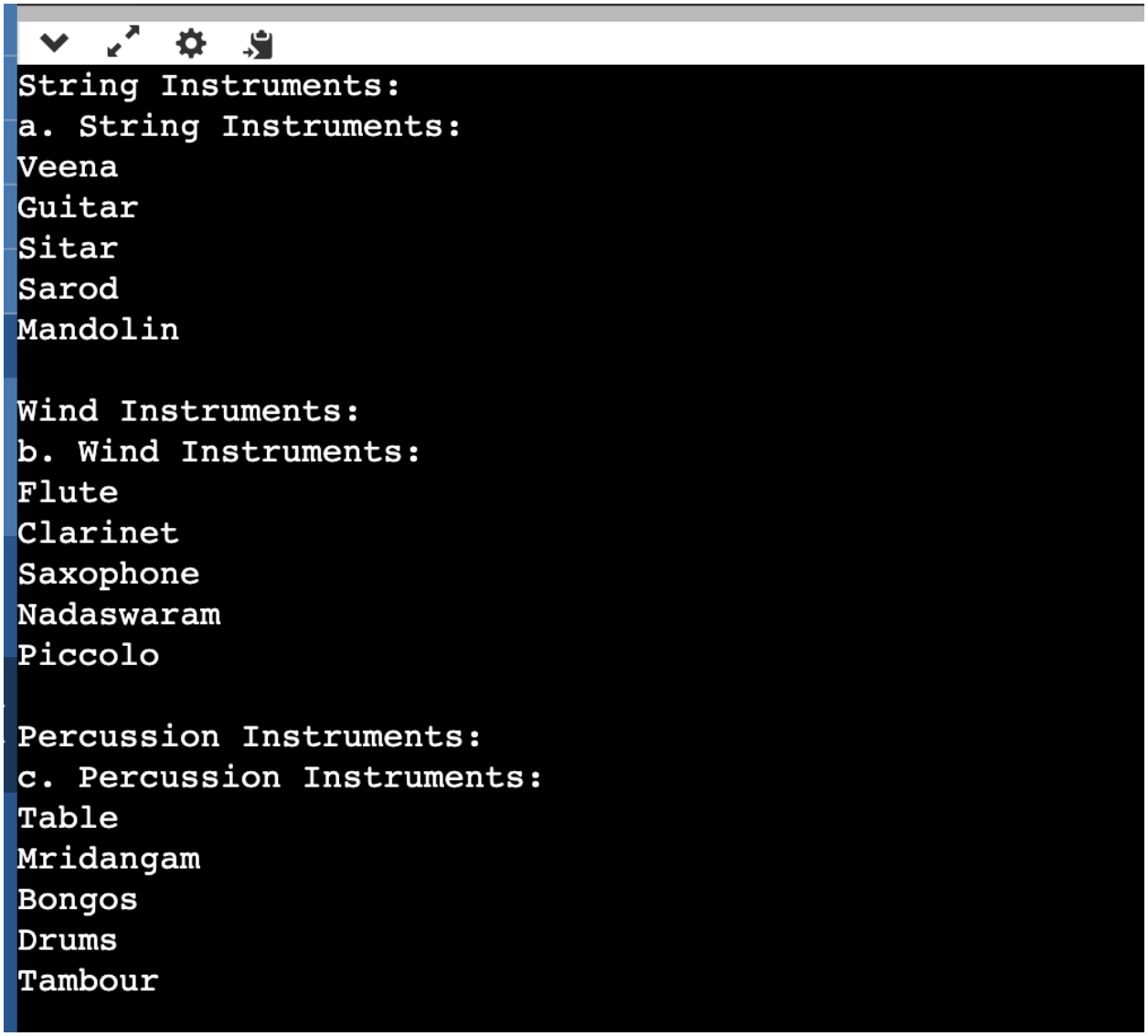
```
Rectangle 1:
Length: 5, Width: 2.5
Area: 12.5, Perimeter: 15

Rectangle 2:
Length: 5, Width: 18.9
Area: 94.5, Perimeter: 47.8

Rectangles have different areas.

After updating dimensions for Rectangle 1:
Rectangle 1:
Length: 15, Width: 6.3
Area: 94.5, Perimeter: 42.6

Rectangle 2:
Length: 5, Width: 18.9
Area: 94.5, Perimeter: 47.8

Both rectangles have the same area.
```

Q4.

main.cpp

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

class MusicIns {
private:
    string instruments[5];

public:
    void stringInstrument() {
        instruments[0] = "Veena";
        instruments[1] = "Guitar";
        instruments[2] = "Sitar";
        instruments[3] = "Sarod";
        instruments[4] = "Mandolin";
    }

    void windInstrument() {
        instruments[0] = "Flute";
        instruments[1] = "Clarinet";
        instruments[2] = "Saxophone";
        instruments[3] = "Nadaswaram";
        instruments[4] = "Piccolo";
    }

    void percInstrument() {
        instruments[0] = "Table";
        instruments[1] = "Mridangam";
        instruments[2] = "Bongos";
        instruments[3] = "Drums";
        instruments[4] = "Tambour";
    }

    void get() {
        cout << "a. String Instruments:\n";
        for (int i = 0; i < 5; ++i) {
            cout << instruments[i] << endl;
        }
    }

    void show() {
        cout << "b. Wind Instruments:\n";
```

```
        for (int i = 0; i < 5; ++i) {
            cout << instruments[i] << endl;
        }
    }

    void display() {
        cout << "c. Percussion Instruments:\n";
        for (int i = 0; i < 5; ++i) {
            cout << instruments[i] << endl;
        }
    }
};

int main() {
    MusicIns music;

    // Initialize string instruments
    music.stringInstrument();
    cout << "String Instruments:" << endl;
    music.get();

    // Initialize wind instruments
    music.windInstrument();
    cout << "\nWind Instruments:" << endl;
    music.show();

    // Initialize percussion instruments
    music.percInstrument();
    cout << "\nPercussion Instruments:" << endl;
    music.display();

    return 0;
}
```


String Instruments:
a. String Instruments:
Veena
Guitar
Sitar
Sarod
Mandolin
Wind Instruments:
b. Wind Instruments:
Flute
Clarinet
Saxophone
Nadaswaram
Piccolo
Percussion Instruments:
c. Percussion Instruments:
Table
Mridangam
Bongos
Drums
Tambour