**Lab 14 Write a c++ program to implement single and multilevel inheritance**

#include <iostream>

#include <string>

using namespace std;

class Person

{

protected:

string name;

public:

Person(string name = "Unknown")

{

this->name = name;

}

void setName(string n)

{

name = n;

}

string getName()

{

return name;

}

void displayPersonDetails()

{

cout << "Name: " << name << endl;

}

};

class Student : public Person

{

protected:

int rollNo;

float marks[3];

float average;

string grade;

public:

Student(string name = "Unknown", int rollNo = 0, float mark1 = 0.0, float mark2 = 0.0, float mark3 = 0.0)

: Person(name)

{

this->rollNo = rollNo;

this->marks[0] = mark1;

this->marks[1] = mark2;

this->marks[2] = mark3;

this->average = 0.0;

this->grade = "F";

}

void setStudentDetails(int roll, float mark1, float mark2, float mark3)

{

rollNo = roll;

marks[0] = mark1;

marks[1] = mark2;

marks[2] = mark3;

}

void calculateAverage()

{

float total = 0;

for (int i = 0; i < 3; i++)

{

total += marks[i];

}

average = total / 3;

}

void calculateGrade()

{

if (average >= 90)

{

grade = "A+";

}

else if (average >= 80)

{

grade = "A";

}

else if (average >= 75)

{

grade = "B+";

}

else if (average >= 70)

{

grade = "B";

}

else if (average >= 60)

{

grade = "C";

}

else

{

grade = "F";

}

}

void displayStudentDetails()

{

displayPersonDetails();

cout << "Roll Number: " << rollNo << endl;

cout << "Marks in 3 subjects: ";

for (int i = 0; i < 3; i++)

{

cout << marks[i] << " ";

}

cout << endl;

cout << "Average Marks: " << average << endl;

cout << "Grade: " << grade << endl;

}

};

class Graduate : public Student

{

private:

string graduationYear;

public:

Graduate(string name = "Unknown", int rollNo = 0, float mark1 = 0.0, float mark2 = 0.0, float mark3 = 0.0, string gradYear = "Not set")

: Student(name, rollNo, mark1, mark2, mark3)

{

graduationYear = gradYear;

}

void setGraduationYear(string year)

{

graduationYear = year;

}

void displayGraduateDetails()

{

displayStudentDetails();

cout << "Graduation Year: " << graduationYear << endl;

}

};

int main()

{

Student student("Alice", 101, 85.5, 92.0, 78.5);

student.calculateAverage();

student.calculateGrade();

student.displayStudentDetails();

Graduate graduate("Bob", 202, 88.5, 79.0, 91.0, "2024");

graduate.calculateAverage();

graduate.calculateGrade();

graduate.displayGraduateDetails();

return 0;

}