**School of Computing and Data Science**

**Sai University**

**Practice Set 3: C++ Basics**

1. **Create a class Student with private data members name and age. Write setter and getter methods to assign and retrieve their values. Demonstrate their use in main().**
2. #include <iostream>
3. #include <string>
4. using namespace std;
5. class Student {
6. private:
7. string name;
8. int age;
9. public:
10. // Setter methods
11. void setName(string n) {
12. name = n;
13. }
14. void setAge(int a) {
15. age = a;
16. }
17. // Getter methods
18. string getName() {
19. return name;
20. }
21. int getAge() {
22. return age;
23. }
24. };
25. int main() {
26. Student s1;
27. // Assign values using setters
28. s1.setName("Alice");
29. s1.setAge(20);
30. // Retrieve values using getters
31. cout << "Student Name: " << s1.getName() << endl;
32. cout << "Student Age: " << s1.getAge() << endl;
33. return 0;
34. }

**2.Define a class BankAccount with a private member balance. Provide methods setBalance() and getBalance() to update and view the balance. Ensure that negative values cannot be assigned.**

1. #include<iostream>
2. #include<string>
3. using namespace std;
4. class BankAccount{
5. private:
6. double balance;
7. public:
8. void setBalance(double b){
9. if(b>=0){
10. balance = b;
11. }
12. else{
13. cout<<"Invalid Balance"<<endl;
14. }
15. }
16. double getBalance(){
17. return balance;
18. }
20. };
21. int main(){
22. BankAccount acc;
23. acc.setBalance(1000);
24. cout<<"Balance: "<<acc.getBalance()<<endl;
25. acc.setBalance(-500); // Invalid balance
26. cout<<"Balance: "<<acc.getBalance()<<endl; // Should still be 1000
27. }

**3. Write a program that defines a class Book with private members title and price. Implement setters and getters for both members, and print the details of the book object.**

#include<iostream>

#include<string>

using namespace std;

class book{

    private:

        string title;

        string author;

    public:

        void setTitle(string t){

            title = t;

        }

        void setAuthor(string a){

            author = a;

        }

        string getTitle(){

            return title;

        }

        string getAuthor(){

            return author;

        }

};

int main(){

    book b1;

    b1.setTitle("C++ Programming");

    b1.setAuthor("Alice");

    cout << "Title: " << b1.getTitle() << endl;

    cout << "Author: " << b1.getAuthor() << endl;

    return 0;

}

**4. Create a class Rectangle with private data members length and width. Write setter and getter methods and calculate the area using them.**

#include<iostream>

#include<string>

using namespace std;

class rectangle{

    private:

    int length;

    int width;

    public:

    void setLength(int l){

        length=l;

    }

    void setWidth(int w){

        width=w;

    }

    int area(){

        return length\*width;

    }

};

int main(){

    rectangle r1;

    r1.setLength(5);

    r1.setWidth(6);

    cout<<"Area of rectangle: "<<r1.area()<<endl;

    return 0;

}

**5. Define a class Employee with private members id and salary. Use setters and getters to initialize and display their values. In main(),create multiple employees and print their details.**

#include<iostream>

#include<string>

using namespace std;

class employee{

    private:

    int id;

    double salary;

    public:

    void setId(int a){

        id=a;

    }

    void setSalary(double b){

        salary=b;

    }

    int getId(){

        return id;

    }

    double getSalary(){

        return salary;

    }

};

int main(){

    employee e1;

    e1.setId(101);

    e1.setSalary(50000.50);

    cout<<"Employee ID: "<<e1.getId()<<endl;

    cout<<"Employee Salary: "<<e1.getSalary()<<endl;

    employee e2;

    e2.setId(102);

    e2.setSalary(60000.75);

    cout<<"Employee ID: "<<e2.getId()<<endl;

    cout<<"Employee Salary: "<<e2.getSalary()<<endl;

    return 0;

}

**6. Write a class Car with private members brand and model. Provide setter and getter methods. In main(), create an array of cars and use the methods to assign and print their values.**

#include <iostream>

#include <string>

using namespace std;

class car{

    private:

    string brand;

    string model;

    public:

    void setBrand(string b){

        brand = b;

    }

    void setModel(string m){

        model = m;

    }

    string getBrand(){

        return brand;

    }

    string getModel(){

        return model;

    }

};

int main(){

    const int size = 3;

    car cars[size];

    cars[0].setBrand("Toyota");

    cars[0].setModel("Corolla");

    cars[1].setBrand("Honda");

    cars[1].setModel("Civic");

    cars[2].setBrand("Ford");

    cars[2].setModel("Mustang");

    cout<<"car details:"<<endl;

    for(int i=0; i<size; i++){

        cout<<"car"<<i+1<<":"<<cars[i].getBrand()<<" "<<cars[i].getModel()<<endl;

    }

    return 0;

}

**7. Implement a class Circle with a private data member radius. Provide setters and getters, and an additional method getArea() that uses the getter to calculate the area.**

#include <iostream>

#include <string>

using namespace std;

class circle{

     private:

        float radius;

     public:

        void setRadius(float r){

            radius = r;

        }

        float area(){

            return 3.14 \* radius \* radius;

        }

};

int main(){

    circle c1;

    c1.setRadius(5.5);

    cout << "Area of circle: " << c1.area() << endl;

    return 0;

}

**8. Create a class Account with private members accountNumber and balance. Provide setter and getter methods. In main(), ensure that account details can only be accessed through these methods.**

#include <iostream>

#include <string>

using namespace std;

class Account{

     private:

        int account\_number;

        float balance;

     public:

        void setAccountnum(int a){

            account\_number = a;

        }

        void setBalance(float b){

            balance = b;

        }

        int getAccountnum(){

            return account\_number;

        }

        float getBalance(){

            return balance;

        }

};

int main(){

    Account acc1;

    acc1.setAccountnum(12345);

    acc1.setBalance(1000.50);

    cout << "Account Number: " << acc1.getAccountnum() << endl;

    cout << "Balance: $" << acc1.getBalance() << endl;

    return 0;

}

**9. Write a class Temperature with a private member celsius. Provide setCelsius() and getFahrenheit() methods to convert the stored temperature to Fahrenheit.**

#include <iostream>

using namespace std;

class Temperature {

private:

    double celsius;  // temperature in Celsius

public:

    // Setter method

    void setCelsius(double c) {

        celsius = c;

    }

    // Getter method (convert to Fahrenheit)

    double getFahrenheit() {

        return (celsius \* 9.0 / 5.0) + 32;

    }

};

int main() {

    Temperature t;

    double c;

    cout << "Enter temperature in Celsius: ";

    cin >> c;

    t.setCelsius(c);

    cout << "Temperature in Fahrenheit: " << t.getFahrenheit() << endl;

    return 0;

}

**10. Define a class University with private members name and ranking.Provide setters and getters. Demonstrate in main() that private data members cannot be accessed directly, but only via the methods.**

#include <iostream>

#include <string>

using namespace std;

class university {

    private:

        string name;

        int rank;

    public:

        void setName(string n) {

            name = n;

        }

        void setRank(int r) {

            rank = r;

        }

        string getName() {

            return name;

        }

        int getRank() {

            return rank;

        }

};

int main() {

    university uni;

    uni.setName("Harvard");

    uni.setRank(1);

    cout << "University Name: " << uni.getName() << endl;

    cout << "University Rank: " << uni.getRank() << endl;

    return 0;

}