Name: Diptangshu Dey

Roll No. 20CS8018

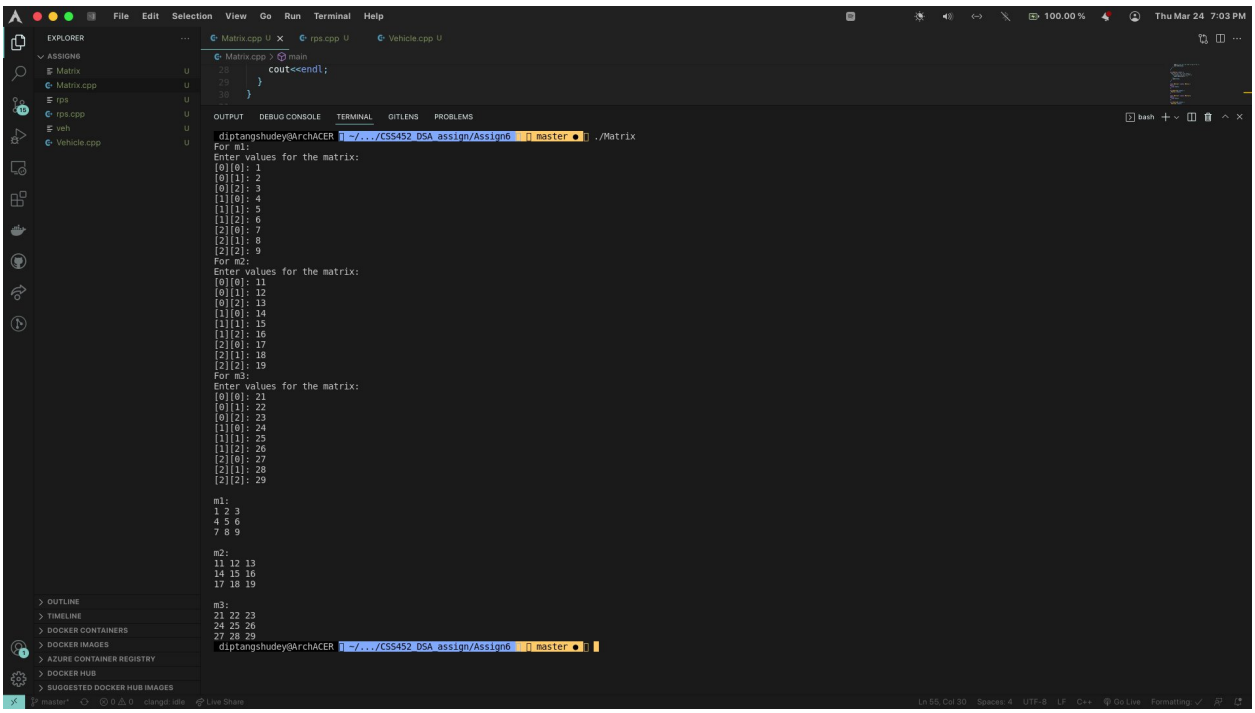
Assignment-6

1. Code:

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

class Matrix {
protected:
  int val[3][3];

public:
  void show();
  void read();
};

void Matrix::read() {
  cout<<"Enter values for the matrix: "<<endl;
  for (int i = 0; i < 3; i++) {
    for (int j = 0; j < 3; j++) {
      cout << "[" << i << "][" << j << "]: ";
      cin>>val[i][j];
    }
  }
}

void Matrix::show() {
  for (int i = 0; i < 3; i++) {
    for (int j = 0; j < 3; j++) {
      cout<<val[i][j]<<" ";
    }
    cout<<endl;
  }
}

class MatrixA : public Matrix {
public:
  void show();
};

void MatrixA::show() {
  Matrix::show();
}

class MatrixB : public MatrixA {
public:
  void show();
};
```

```
void MatrixB::show() {
  MatrixA::show();
}

int main() {
  Matrix m1;
  MatrixA m2;
  MatrixB m3;

  cout << "For m1: " << endl;
  m1.read();

  cout << "For m2: " << endl;
  m2.read();

  cout << "For m3: " << endl;
  m3.read();

  cout << endl << "m1: "<<endl;
  m1.show();

  cout << endl << "m2: " << endl;
  m2.show();

  cout << endl << "m3: " << endl;
  m3.show();

  return 0;
}
```

Output:



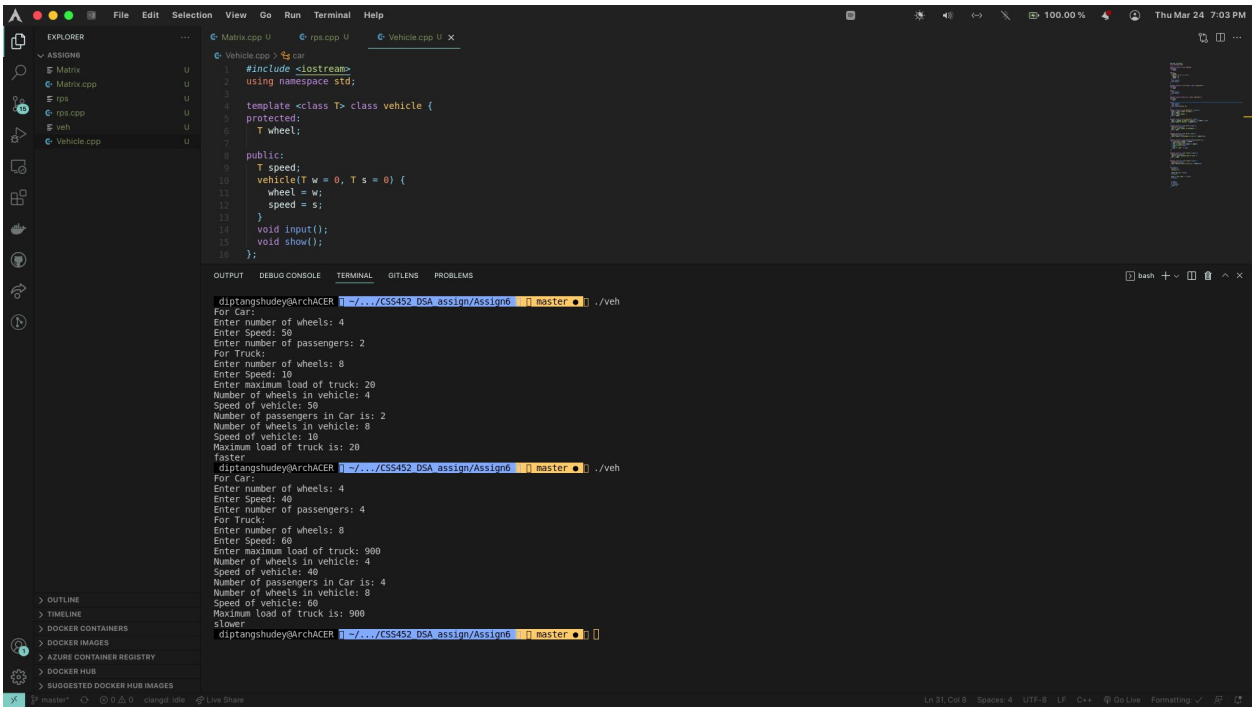
2. Code:

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

template <class T> class vehicle {
protected:
  T wheel;

public:
  T speed;
  vehicle(T w = 0, T s = 0) {
    wheel = w;
    speed = s;
  }
  void input();
  void show();
};

template <class T> class truck : public vehicle<T> {
protected:
  T load;

public:
  void input();
  void show();
};

template <class T>class car : public vehicle<T> {
protected:
  T pass;
```

```
public:
  void input();
  void show();
  void isFast(truck<T> t);
};

template <class T> void vehicle<T>:: input() {
  cout << "Enter number of wheels: ";
  cin >> wheel;
  cout << "Enter Speed: ";
  cin >> speed;
}

template <class T> void vehicle<T>::show() {
  cout << "Number of wheels in vehicle: " << wheel << endl;
  cout<<"Speed of vehicle: "<<speed<<endl;
}

template <class T> void car<T>::input() {
  vehicle<T>::input();
  cout << "Enter number of passengers: ";
  cin >> pass;
}

template <class T> void car<T>::show() {
  vehicle<T>::show();
  cout<<"Number of passengers in Car is: "<<pass<<endl;
}

template <class T> void car<T>::isFast(truck<T> t) {
  if (vehicle<T>::speed > t.speed) {
    cout<<"faster"<<endl;
  } else if (vehicle<T>::speed < t.speed) {
    cout<<"slower"<<endl;
  } else {
    cout << "same " << endl;
  }
}

template <class T> void truck<T>::input() {
  vehicle<T>::input();
  cout << "Enter maximum load of truck: ";
  cin >> load;
}

template <class T> void truck<T>::show() {
  vehicle<T>::show();
  cout<<"Maximum load of truck is: "<<load<<endl;
}
```

```
int main() {
  car<int> c;
  truck<int> t;

  cout<<"For Car: "<<endl;
  c.input();

  cout << "For Truck: " << endl;
  t.input();

  c.show();
  t.show();
  c.isFast(t);
  return 0;
}
```

Output:



3. Code:

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

class Tool
{
protected:
  int strength;
  char type;
```

```
public:
  void setStrength(int s) { strength = s; }
  bool fight(Tool t);
};

bool Tool::fight(Tool t) {
  if ((type == 'r' && t.type == 'p') || (type == 'p' && t.type == 's') || (type == 's' && t.type == 'r'))
{
    if (strength / 2 > t.strength) {
       return true;
    } else {
      return false;
    }
  } else if ((type == 'r' && t.type == 's') || (type == 's' && t.type == 'p') ||
           (type == 'p' && t.type == 'r')) {
    if (strength * 2 > t.strength) {
      return true;
    } else {
      return false;
    }
  }

  if (strength > t.strength) {
    return true;
  } else {
    return false;
  }
};

/*Implement class Scissors */
class Scissors : public Tool {
public:
  Scissors(int s) {
    Tool::setStrength(s);
    type = 's';
  }
};

/*Implement class Paper */
class Paper : public Tool {
public:
  Paper(int s) {
    Tool::setStrength(s);
    type = 'p';
  }
};

/*Implement class Rock */
class Rock : public Tool {
public:
```

```
  Rock(int s) {
    Tool::setStrength(s);
    type = 'r';
  }
};

int main() {

        // Example main function

        // You may add your own testing code if you like

        Scissors s1(5);

        Paper p1(7);

        Rock r1(15);

        cout << s1.fight(p1) << p1.fight(s1) << endl;

        cout << p1.fight(r1) << r1.fight(p1) << endl;

        cout << r1.fight(s1) << s1.fight(r1) << endl;

        return 0;

}
```

Output: