

Question 1

(Constructors=10%, Functions=10%, Operators=20%, Inheritance=30%, Polymorphism=30%)

A main() function is given below. Based on this function, your task is to write complete code required to run the main() function successfully and produce the exact output given.

For each class provide:

- Parameterized constructor with default arguments and Copy Constructor(use base initializer list with both constructors).
- Destructor(with no memory leakage).
- Getters/Setters for all private attributes(with no memory leakage and no returning of original memory handler).
- Assignment Operator(with no memory leakage).
- Don't provide function where you can overload operators, therefore must provide the following operators: **cin» and cout« operators.**

Before proceeding to the solution, please read the note given after main (on the next page).

```

1 Car *ptr[6];
2 ptr[0] = new HondaCity(1.6, "white", 1300, 12.7, "manual", "Japan", false) ;
3 //Price(Million); Colour; Power(cc); Mileage; Transmission; Country;
  Navigation
4 ptr[1] = new HondaCivic(2.25, "black", 1800, 9.5, "automatic", "Pakistan",
  true, false, false) ;
5 //Price(Million); Colour; Power(cc); Mileage; Transmission; Country;
  Navigation; Sunroof; Hybrid
6 ptr[2] = new Honda(1.65, "red", 2000, 12.5, "manual", "Thailand", false) ;
7 //Price(Million); Colour; Power(cc); Mileage; Transmission; Country;
  Navigation
8 ptr[3] = new SuzukiMehran(0.75, "blue", 796, 15, false, true) ;
9 //Price(Million); Colour; Power (cc); Mileage; AC; Sound System
10 ptr[4] = new SuzukiSwift(1.3, "white", 1300, 11.7, true, false) ;
11 //Price(Million); Colour; Power (cc); Mileage; AC; Power Mirro r s
12 ptr[5] = new Suzuki(1, "silver", 1500, 11.7, false) ;
13 //Price(Million); Colour; Power (cc); Mileage; A C
14 for (int i = 0; i < 6; i++)
15 {
16     cout << i + 1 << endl;
17     ptr[i] -> printInfo() ;
18     cout << endl ;
19 }
20 Car*c;
21 c = new Car(2.2, "charcoal grey", 1800, 8.8);
22 //Price(Million); Colour; Power (cc); Mileage;
23 //The above statement should result in error, your program should not allow
  you to create object of Base class implicitly
24 for (int i = 0; i < 6; i++)
25 delete ptr[i];
  
```

NOTE:

- Using string data type is not allowed (use char*)
- Use of built-in functions is not allowed.
- Your program should not be able to make object of Base class Car.

General Requirements:

- No global variables!
- All data members of your classes must be private
- Use the const qualifier on member functions wherever it is appropriate.
- The code for this program should be portable.

OUTPUT:

```
1
Price: 1.6      Colour: white      Power: 1300      Mileage: 12.7
      Transmission: manual      Country: Japan      Navigation: 0
2
Price: 2.25      Colour: black      Power: 1800      Mileage: 9.5
      Transmission: automatic      Country: Pakistan      Navigation: 1
      Sunroof: 0      Hybrid: 0
3
Price: 1.65      Colour: red      Power: 2000      Mileage: 12.5
      Transmission: manual      Country: Thailand      Navigation: 0
4
Price: 0.75      Colour: blue      Power: 796      Mileage: 15
      AC: 0      Sound System: 1
5
Price: 1.3      Colour: white      Power: 1300      Mileage: 11.7
      AC: 1      Power Mirrors: 0
6
Price: 1      Colour: silver      Power: 1500      Mileage: 11.7
      AC: 0
```

Figure 1: OUTPUT