

Pg. 131 – 144, Java Programming *A comprehensive Introduction*

## Class and Object expanded - Continued

### Section 1: Define / Answer

Parameter: Parameters are the variables that are listed as part of a method declaration. Each parameter must have a unique name and a defined data type.

Argument: Arguments is a list of Parameters that can be passed to your Java Programm at start up.

Diagram a short code example of a method/parameter/argument in java?  
Explain what each piece of the code represents.

Public static int subtract(int l, int j) { //parameter

Return l – j;

}

Public static void main(String[] arg) {

Int l = 1;

Int j = 0;

Int subtract = subtract(l, j); arguments

}

1. Constructor (book definition): A Java class constructor initializes instances (objects) of that class. Typically, the constructor initializes the fields of the object that need initialization. Java constructors can also take parameters, so fields can be initialized in the object at creation time.

### **Programming Assignment**

Task 1- Create a computer program that will calculate the fuel needed to go a specific number of miles for 3 different vehicles.

The program should create a “programmer created” class.

In the “programmer created” class set-up the program so it uses a parameterized method in the Vehicle class to return fuel needed for a specific distance. Allow user to manually enter distance.

Use a constructor with parameters to assign the values for passengers, fuel capacity, mpg.

Each Vehicle type should have unique values for number of passengers, fuel capacity, and miles per gallon.

Follow the sample below and return information on 3 vehicle types.

### **Sample Output: // Create similar output for 3 Vehicle Types**

To go 252 miles a minivan needs 12.0 gallons of fuel.

The minivan carries: 7

The minivan has a fuel capacity of: 16

The minivan mpg: 21

```
1  /*
2   * To change this license header, choose License Headers in Project Properties.
3   * To change this template file, choose Tools | Templates
4   * and open the template in the editor.
5   */
6
7   package javaapplication1;
8
9   import java.util.Scanner;
10
11  class Vehicle {
12      int passangers, fuelcap, mpg;
13
14      Vehicle(int p, int f, int m){
15          passangers = p;
16          fuelcap = f;
17          mpg = m;
18      }
19
20      double fuelneeded(int miles) {
21          return (double) miles / mpg;
22      }
23
24  }
25  public class JavaApplication1 {
26
27      /**
28       * @param args the command line arguments
29       */
30      public static void main(String[] args) {
31
32          Scanner input = new Scanner(System.in);
33          double gallons;
34
35          //minivan
36          Vehicle minivan = new Vehicle(7, 16, 21);
37          System.out.print("Please enter a distance for the minivan: ");
38          int dist = input.nextInt();
```

CIS 36A – 13<sup>th</sup> In Class/ Lab Assignment – 10 Points

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```

39     gallons = minivan.fuelneeded(dist);
40     System.out.println("To go " + dist + " miles a minivan need " + gallons + " gallons of fuel");
41     System.out.println("The minivan carries: " + minivan.passangers);
42     System.out.println("The minivan has a fuel capacity of : " + minivan.fuelcap);
43     System.out.println("The minivan mpg: " + minivan.mpg);
44
45     //sportcar
46     Vehicle sportcar = new Vehicle(2, 14, 12);
47     System.out.print("Please enter a distance for the sportcar: ");
48     dist = input.nextInt();
49     gallons = sportcar.fuelneeded(dist);
50     System.out.println("To go " + dist + " miles a sportcar need " + gallons + " gallons of fuel");
51     System.out.println("The sportcar carries: " + sportcar.passangers);
52     System.out.println("The sportcar has a fuel capacity of : " + sportcar.fuelcap);
53     System.out.println("The sportcar mpg: " + sportcar.mpg);
54
55     //bus
56     Vehicle bus = new Vehicle(9, 23, 22);
57     System.out.print("Please enter a distance for the bus: ");
58     dist = input.nextInt();
59     gallons = bus.fuelneeded(dist);
60     System.out.println("To go " + dist + " miles a bus need " + gallons + " gallons of fuel");
61     System.out.println("The bus carries: " + bus.passangers);
62     System.out.println("The bus has a fuel capacity of : " + bus.fuelcap);
63     System.out.println("The bus mpg: " + bus.mpg);
64
65
66 }
67
68 }
69

```

```

run:
Please enter a distance for the minivan: 21
To go 21 miles a minivan need 1.0 gallons of fuel
The minivan carries: 7
The minivan has a fuel capacity of : 16
The minivan mpg: 21
Please enter a distance for the sportcar: 22
To go 22 miles a sportcar need 1.8333333333333333 gallons of fuel
The sportcar carries: 2
The sportcar has a fuel capacity of : 14
The sportcar mpg: 12
Please enter a distance for the bus: 23
To go 23 miles a bus need 1.0454545454545454 gallons of fuel
The bus carries: 9
The bus has a fuel capacity of : 23
The bus mpg: 22
BUILD SUCCESSFUL (total time: 54 seconds)

```

Task 2- Start to construct complete programs. Think about the overall functioning of the program. Use Assignment #12 Task1 as the bases for this exercise.

Create a **do-while** loop / **with switch case** statements that operate the program.

Present the user with a menu and options. Based upon the options selected by the user the program should operate correctly.

Create a computer program that will calculate the range for 3 different vehicles.

The program should create a “programmer created” class, where 3 **int objects** are created passengers, fuel capacity, mpg.

Set-up the program so the user can manually input the values for passengers, fuel capacity, mpg for the 3 created vehicles.

Create a **void** method inside the “programmer created “ class to calculate vehicle range.

**range = fuel capacity \* miles per gallon.**

Each Vehicle type should have unique values for number of passengers, fuel capacity, and miles per gallon.

Attach Snipping photos as the program operates, including menu prompts, outputs etc.

Sample Output: // Create similar output for 3 Vehicle Types

On next page-

**Change input values now that we are creating the same program multiple times.**

\*\*\*\*\*

```
* Main Menu:                                *
* Enter # to run program or Quit            *
* 1) Enter Fuel Capacity                    *
* 2) Enter Miles Per Gallon                 *
* 3) Calculate Range                        *
* 4) Quit                                   *
```

\*\*\*\*\*

1

You Selected Option 1:

Enter fuel capacity in Integers Please

25

You entered: 25

2

You Selected Option 2:

Enter Miles Per Gallon Please

29

You entered: 29

The minivan carries= 8

The minivan has a fuel capacity of = 25

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The minivan mpg =19

The minivan has a range of: 475 miles





```
61         System.out.println("You Selected Option 3: ");
62         car.milespers();
63         break;
64     case 4:
65         System.out.println("You Selected Option 4: ");
66         car.range();
67         break;
68     case 5:
69         System.out.println("The minivan carries: " + car.passangers);
70         System.out.println("The minivan has a fuel capacity of : " + car.fuelcap);
71         System.out.println("The minivan mpg: " + car.mpg);
72         car.range();
73         System.out.println("");
74         break;
75
76     case 6:
77         System.out.println("You Selected Option 6: \n"
78             + "You Quided the program.");
79         break;
80
81     default:
82         System.out.println("WRONG OPTION!");
83     }
84 } while (option != 6);
85 }
86 }
87 }
```

run:

```

*****
*           MAIN MENUS/           *
* Enter # to run program or Quit *
* 1)Enter Passangers             *
* 2)Enter Fuel Capacity          *
* 3)Enter Miles Per Gallon       *
* 4)Calculate Range              *
* 5)Print                        *
* 6)Quit                         *
*****

```

Please Enter Option: 1

You Selected Option 1:

Enter passangers: 8

You entered 8

```

*****
*           MAIN MENUS/           *
* Enter # to run program or Quit *
* 1)Enter Passangers             *
* 2)Enter Fuel Capacity          *
* 3)Enter Miles Per Gallon       *
* 4)Calculate Range              *
* 5)Print                        *
* 6)Quit                         *
*****

```

Please Enter Option: 2

You Selected Option 2:

Enter fuel: 25

You entered 25

```

*****
*           MAIN MENUS/           *
* Enter # to run program or Quit *
* 1)Enter Passangers             *
* 2)Enter Fuel Capacity          *
* 3)Enter Miles Per Gallon       *
* 4)Calculate Range              *
* 5)Print                        *
* 6)Quit                         *
*****

```

Please Enter Option: 3

You Selected Option 3:

Enter Miles per gallons: 19

You entered 19

```

*****
*           MAIN MENUS/           *
* Enter # to run program or Quit *
* 1)Enter Passangers             *
* 2)Enter Fuel Capacity          *
* 3)Enter Miles Per Gallon       *

```

```

* 4)Calculate Range *
* 5)Print *
* 6)Quit *
*****
Please Enter Option: 4
You Selected Option 4:
The range is 475

*****
*          MAIN MENUS/          *
* Enter # to run program or Quit *
* 1)Enter Passangers *
* 2)Enter Fuel Capacity *
* 3)Enter Miles Per Gallon *
* 4)Calculate Range *
* 5)Print *
* 6)Quit *
*****
Please Enter Option: 5
The minivan carries: 8
The minivan has a fuel capacity of : 25
The minivan mpg: 19
The range is 475

*****
*          MAIN MENUS/          *
* Enter # to run program or Quit *
* 1)Enter Passangers *
* 2)Enter Fuel Capacity *
* 3)Enter Miles Per Gallon *
* 4)Calculate Range *
* 5)Print *
* 6)Quit *
*****
Please Enter Option: 8
WRONG OPTION!

*****
*          MAIN MENUS/          *
* Enter # to run program or Quit *
* 1)Enter Passangers *
* 2)Enter Fuel Capacity *
* 3)Enter Miles Per Gallon *
* 4)Calculate Range *
* 5)Print *
* 6)Quit *
*****
Please Enter Option: 6
You Selected Option 6:
You Quited the program.
BUILD SUCCESSFUL (total time: 20 seconds)

```