Web Engineering

Course Instructor: Wasim Ahmed
Assignment 01
Agenda: Get hands-on practice of basics of Java
Total Marks: 100
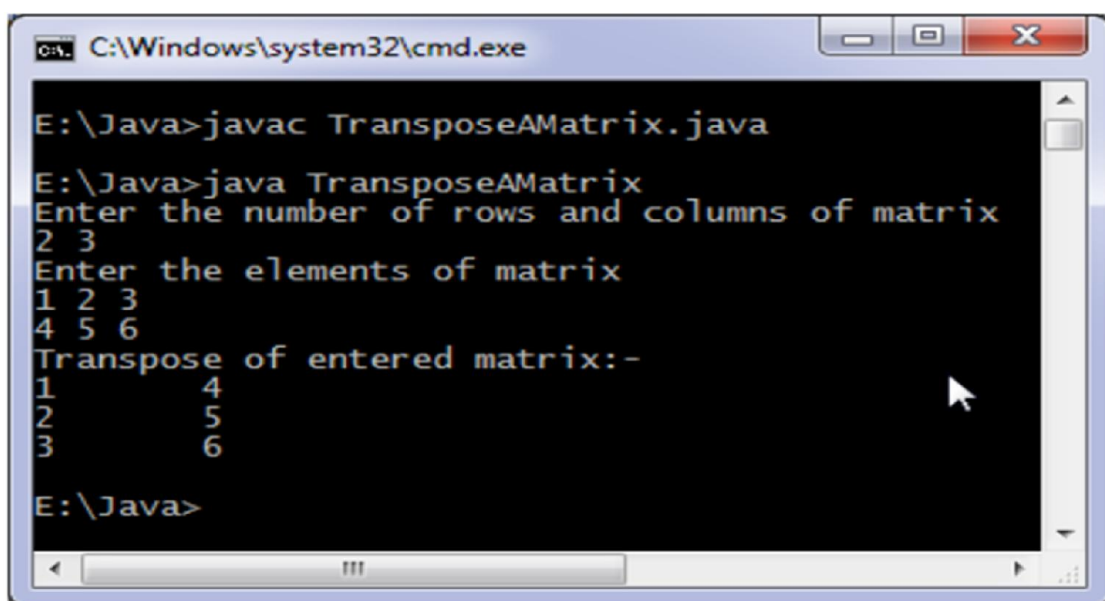**Issue Date:** Saturday October 15th, 2016
Submission Deadline: 20-OCT-2016, Thursday till 11:59pm

Instructions and guidelines

- Play it safe, you should know that programming assignments are evaluated ELECTRONICALLY to detect plagiarism.SO, DO NOT COPY! Anyone caught being indulged in the act of plagiarism may be awarded straight away an "F" grade in the course. (Work on this assignment individually)
- Comment and indent your code properly.
- You're not allowed to use any IDE. Write your code in **Notepad** or **Notepad++** and compile it through **CMD**
- Read the complete assignment statement carefully before starting the implementation.
- **Task Number 6 should be submitted hand-written.**
- **You can discuss any problem you face while working on Assignment with TA's in case you need any help.**
- Submit this assignment's soft copy in a compressed Single Folder whose name should be your complete roll number (e.g. BSEF14M001.zip and nothing else).
- Subject Format for Email: A01:Roll#:Name
- Your assignment will be declined if you violate any of the submission guidelines.
- **NO LATE SUBMISSIONS WILL BE ACCEPTED**
- **Best Of Luck**

Task#1: Input matrix order and values from user and output its transpose.   **(10)**

Task#2: (10)

Ask user to enter the option to calculate area of 1/2/3 so on … If User selects option to calculate the sine of an angle ask degrees and then convert into radians and then take sin of angle

Here are the conversions to be done:

- 1 => angle in radians
- 2 => sine of angle
- 3=> cosine of angle
- 4 => tan of angle

If the user enters an unrecognized unit, give an error message rather than bogus output. The output pane displays the following:

This is Math's Implementation Program
Press
   1. Angle in radian
   2. Sine of Angle
   3. Cosine of angle
   4. Tangent of angle
1

(**Hint**: Explore java.lang.Math for above mentioned task.)

Task#3: (5)

Write a Java program that first reads a positive integer from the user- let's call it **howMany** (or N). Then the program **readshowMany** (or N) pairs of integers - let's call them n1 and n2. For each pair, the program determines if the first component in the pair is a multiple of the second component, in other words, if n1 is a multiple of n2. For example if howMany is 5, your program will read 5 pairs of integers, and for each pair (n1, n2) it will decide if n1 is a multiple of n2.

Task#4:

(5)

List out the Armstrong number ranging from 0-1000? An Armstrong number is the one that equals the sum of its digits raised to the power of the number of digits in that number which is to be checked.
e-g $153 = 1^3 + 5^3 + 3^3$ where 153 is the Armstrong number according to mentioned criteria.

(P.T.O)
Task#5: (20)

Accounts Management System

Suppose a company has hired you to automate their accounts management system. So to keep the account of the salaries of their employees and the profit and loss, you have to develop a software for that purpose.

Where id and username should be unique.

Account Type are:
1. Manager
2. Worker

You have to use arrays of objects for data storing Data

(Admin functions)

Admin should have an admin panel through which he/she can,
- Add worker
- See salary of a particular worker
- Display all workers

(Worker functions)

Worker can
- Login
- Logout
- Change password
- View her/his salary

Sample Input/output:

Main Screen(s)
Welcome…. Please select your account type!
1. Admin
2. Worker
Enter your choice: 1
Please Enter your Login Information
Login: abcd
Password: 003

Welcome abcd
Please select an option
1.Add Worker
2. See salary of a particular worker
3. Display All workers
4. Logout.
Please enter your choice:

Main Screen(s)
Welcome,
Please select your account type
1. Administrator

2. Worker
            Enter your choice: 2

            Please Enter your Login Information
                    Login: XYZ
                    Password: 037
            Welcome xyz, Please select an option
                    1. Change password
                    2. View your salary

Task#6: (Find Errors)   (25)
Find and explain the errors in given code snippets:- Use the following code snippet to find the error in
question 1 and 2. **(This Task should be submitted hand-written.)**

        Class X {
                int a;
                Static void display() {
                        System.out.Println("Helllo world");
                }
                X(int a) {
                        this.a=a;
                        }
        }

1- public static void main (String []args) {
        X obj= new X(1);
        Obj.display();
    }

2- public static void main (String []args) {
        X obj= new X(1);
        X obj1 = new X(1);
        If(obj1==obj2)
            System.out.println("True");
    }

3- Public void display() {
        System.out.Println("Hello World");
    }
    public static void main (String []args) {
        display();
    }

4- public static void main (String []args) {
        int a=4; Integer b=a;
    }

5- public static void main (String []args) {
        int arr[10];
        System.out.println(arr.Length);

```java
    }

6- public static void main (String []args) {
        String arr=”hello world”;
        System.out.println(arr\n);
    }


7-
        int[] a = {1, 2, 3};
        int sum = 0;
        for (int i = 0; i < a.length; i++)
            sum = sum + a[i];
            System.out.println("Last = " + i);


8-
         int max(int i, int j) {
                    if (i > j)
                        return i;
                  else
                      return j[i];
                  }
9- void m(int n) {
        int i, j;
        i = 2;
        int k = 1;
        if (i == n)
            k = j;
        else
            j = k;
 }



10- void m(int n) {
         int i;
        if (n == n)
            i = n;
        else
            n = i;
}




11-
 int a = 5;
boolean b = true;
int c = a + b;
double d = a + 1.4;


12- int max(int i, int j) {
        if (i > j)
```

```java
        return i;
    else if (i <= j)
        return j;
}


13- void m(int j) {
        System.out.println("Value is " + j);
        Return;
        j++;
}


14- class MyClass {
        int field;
        void m(int parm) {
            field = parm;
        }
        public static void main(String[] args) {
            MyClass myclass = new MyClass();
            // Create object
            myclass.m(5);
            // Call object's method
            System.out.println(myclass.field);
        }
}

15- class MyClass1 {
        static int field;
        static void m(int parm) {
            field = parm;
        }
        public static void main(String[] args) {
            m(5);
            System.out.println(field);
        }
}


16 - class Test {
        public static void main(String[] args) {
            String s = "Hello world";
            System.out.println(s.substring(10,12));
        }
}
17- public static void main(String[] args) {
        }
        MyClass my;
        my.m(5);
}
```

18-
```
int factorial(int n) {
        if (n == 0)
            return 1;
        else
        return
            n * factorial(n + 1);
}
```

19-
```
static void (int 5) {
        return i/2;
}
```

20-
```
static int getHalf (int 5) {
        return i/2;
 }

 {
public static void main (String []args) {
        getHalf(10.0);
}
```

Task#7:   **(10)**
Tic-Tac-Toe Code two-player game of Tic-Tac-Toe. You'll use a two-dimensional array of chars. you have
to implement proper UI for the game and all boundary checks for wrong inputs.

Parking Plaza ADT   **(15)**

Design a parking Plaza ADT for a parking Plaza which has Multiple Vehicle storing capacity on each floor.
For example Parking plaza has 5 floors. 1st floor can store 10 vehicles, 2nd floor can store 20 vehicles, 3rd
floor has capacity to store 15 vehicles, 4th floor has capacity to store 35 vehicles and 5th floor can store 18
vehicles.
The cost for parking varies according to type of vehicle. The chart for cost (in Rs.) is given in the Table.

Type	General rate per hour (R)	1 – 3 hours (per hour)	3 – 8 hours (per hour)	Fine for 1-2 hours Late (F) (per hour)	Fine for more than 2hours (Per hour)

Motorcycle	5	R	R+20% of R	20%	F+20% of F
Car	10	R	R+30% of R	25%	F+30% of F
Van	12	R	R+35% of R	30%	F+35% of F
Bus	15	R	R+40% of R	40%	F+40% of F

Design the following for parking plaza.
- Vehicle interface as a base class.
- Motorcycle, Car, Van and Bus class as derived classes.

Vehicle
- name a string data member to store the Model of the Car
- V_Number a string data member to save the vehicle number.
- hoursTaken a double type data member to save the total hours taken by vehicle.
- hourlyRate a double type data member to save rate for charging a vehicle
- fineRate a double type variable to save fine rate of every vechile
- getCost() a function to calculate the cost of the parking ticket.
- toString() to return the complete information of vehicle in String.
- getters(), setters()

Motorcycle, Car, Van and Bus (four separate child classes of vehicle)
- getCost() a function to calculate the cost of the parking ticket.
- toString() to return the complete information of vehicle in String.

ParkingPlaza
- Name a string to store the Name of Parking Plaza.
- o Vehicle [] [] arr   a jagged array having arrays of Vehicles. Total number of arrays represents the total floor of ParkingPlaza. Each index of array consist of Parked vehicle, and "null" represents the empty space for a vehicle like shown in the figure.
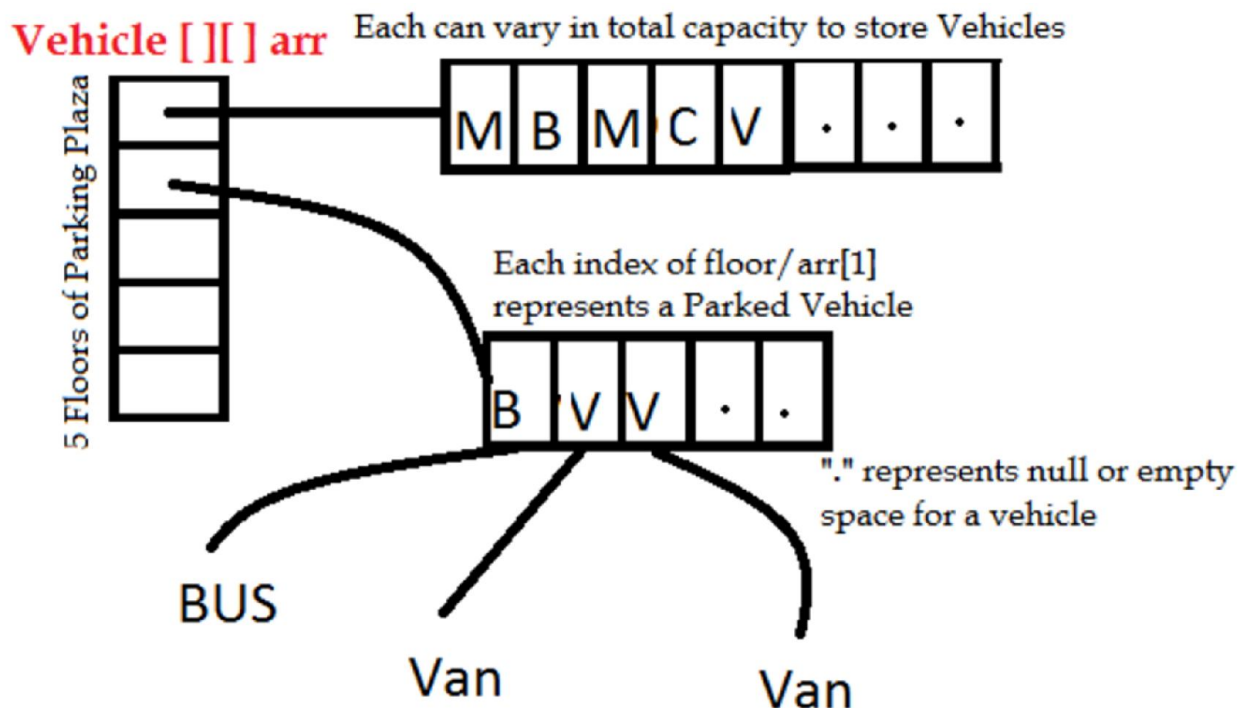
- boolean addNewVehicle(Vehicle v) a public function to park the vehicle on first empty location in arr / Parking Plaza.

- boolean removeVehicle(Vehicle v) a private function to remove the vehicle from parking plaza.
- boolean generateTicket(Vehicle v, int hours) a public function to generate the parking ticket for a parking vehicle when user wants to remove his/her vehicle. This function removes the vehicle by using above function from Parking plaza and generates the ticket according to the hours taken by this vehicle.
- boolean isFull(); o boolean isEmpty();
- printParkingPlaza(); this function prints the whole parking plaza vehicles with their floor number, location and Complete information of Vehicle.

Driver Class

Write a driver class which contains main function and Test the proper functionality of all the classes.