Summer 2014 midterm

Question 01

Question 1. 5 points

1. Write exactly one loop statement - for or while - that prints in a column all of the multiples of 4 from 4 to 40 except for 32. Thus your output should be:

4
8
12
16
20
24
28
36
40

for (int i = 4; i <= 40; i += 4) {
    if (i != 32) {
        System.out.println(i);
    }
}

Question 02

Question 2. 5 points

Suppose s is some String. Write a loop that prints the characters in s in a row, backwards, and with the character "*" between the characters in s. So if s is "cat", for example, your code should print 

t*et* 

If s is "Bike" your code should print

e*ik*B* 

Enter your answer in the box below.

for (int i = s.length() - 1; i >= 0; i--) {
    System.out.print(s.charAt(i) + "*");
}

Question 03
Rewrite this code fragment using a for loop instead of a while loop:

```java
int k = 1;
int total = 0;
int n = 11;
while(k <= n){
    total = total + k + k%2;
    k = k + 1;
}
System.out.println(total);
```

```java
int total = 0;
int n = 11;
for (int k = 1; k <= n; k++) {
    total = total + k + k%2;
}
System.out.println(total);
```

**Question 04**

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**Question 4, 5 points**

Complete the code fragment below so that it prints this water/WATER word pattern: the even lines – lines 0 and 2 – print the word "water" (all lower case), while the the odd lines – lines 1 and 3 – print "WATER" (all upper case).

```
water
WATER
water
WATER
```

Your answer should consist of a single if-then-else statement, and that statement MUST make use of the variable `upper`. This single if-then-else statement should be the answer you submit in the answer box below.

Here is the code fragment:

```java
boolean upper = false;
for(int j = 0; j < 4; j++){
    ***your single if-then-else statement goes here***
    upper = !upper;
}
if (upper) {
    System.out.println("WATER");
} else {
    System.out.println("water");
}
```

**Question 05**
Question 06

public class Pie {
  private String name;
  private int count;
  private double cost;
  public Pie(String name, int quantity, double cost) {
    this.name = name;
    this.quantity = quantity;
    this.cost = cost;
  }
}

public class PieTester {
  public static void main(String[] args) {
    Pie p = new Pie("Apple Pie", 40, 6.10); // make batch of 40 Apple Pies, at cost of $6.10 per pie
    System.out.println("p.getCount() = " + p.getCount() + p.getCost() + " cost " + p.costOfBatch());
    p.resetPriceIn(); // reset pie price in
    System.out.println("cost of bigger batch " + p.costOfBatch());
  }
}
public String getName() {
    return name;
}

public int getCount() {
    return count;
}

public double getCost() {
    return cost;
}

public void setCount(int newCount) {
    count = newCount;
}

public double costOfBatch() {
    return count * cost;
}

Question 07

Question 7. 25 points

Write a complete program in a single class called RepeatChars. It should read in an int value - call it n - and a String - call it s - from the keyboard. If String s has some character - any character, even a space - at position n, your code should print that character n times in a column. On the other hand if n is out of bounds - if n is less than 0, or if its value is the length of s or longer - your code should print the message "out of bounds".

Here are some examples.

________
Inputs: 3 and then "donkey"
code prints
k
k
k

________
Inputs: -2 and then "horse"
code prints
out of bounds

________
Inputs: 10 and then "horse"
code prints
out of bounds

________
Inputs: 5 and then "welcome home!"
code prints
m
m
m
m
m

Note: Your answer doesn't have to be perfect to get full credit, it doesn't have to be commented, and it doesn't have to run. Still, it should be as complete and as correct as you can make it, and should include import statements as needed.

import java.util.Scanner;
public class RepeatChars {

    public static void main(String[] args) {
        Scanner scan1 = new Scanner(System.in);
        int n = scan1.nextInt();

        Scanner scan2 = new Scanner(System.in);
        String s = scan2.nextLine();

        if (n >= 0 && n < s.length()) {
            for (int i = 0; i < n; i++) {
                System.out.println(s.charAt(n));
            }
        } else {
            System.out.println("out of bounds");
        }
    }
}

Question 08

Question 8. 5 points
You sell coffee beans, and your business revolves around the bins where the beans you sell are kept. Consider the CoffeeBin class, given below, which you are developing.

    public class CoffeeBin
    {
        private String kind; // kind of coffee bean in bin
        private int capacity; // capacity of bin
        private int amount; //pounds
        private double cost; // cost per pound

        public CoffeeBin(String k, int cap, int amt, double cost)
        {
            kind = k;
            capacity = cap;
            amount = amt;
            this.cost = cost;
        }

        public String getKind(){return kind;}
        public int getCapacity(){return capacity;}
        public int getAmount() {return amount;}
        public double getCost() {return cost;}
    }

Add a fillBin method with no parameters to the CoffeeBin class. It should fill a calling CoffeeBin object to capacity. For example if kenyabin is a CoffeeBin object with capacity 50 and amount 40, then this statement (in a driver class)

    kenyabin.fillBin();

would set the amount field (instance variable) of kenyabin to 50 pounds, which is the capacity value for that object.

Enter your definition for fillBin in the box below.

    public void fillBin() {
        amount = capacity;
    }

Question 09
Add a `fractionFilled` method with no parameters to the `CoffeeBin` class. It should report the decimal fraction of the calling bin that is filled. For example if `kenyaBin` is a `CoffeeBin` object with capacity 50 and amount 40, then this statement (in a driver class)

```java
double frac = kenyabin.fractionFilled();
```

would set the variable `frac` to .80, since the bin is 40/50 = .80 filled.

Enter your definition for `fractionFilled` in the box below.

```java
public double fractionFilled() {
    return (double)amount / (double)capacity;
}
```

**Question 10**

Now you’re working on a driver class for the `CoffeeBin` class.

```java
public class BinDriver {
    public static void main(String[] args) {
        // driver statements go here
    }
}
```

In the driver class create a `CoffeeBin` object called `mexBin`, which holds beans from Mexico ("mexican" is the kind of bean), has a capacity of 55, has an amount of 30, and costs 9.90 per pound. Enter the statement (to be placed in the driver) that creates this object in the box below.

```java
CoffeeBin mexBin = new CoffeeBin("mexican", 55, 30, 9.90);
```

**Question 11**

```java
public class BinDriver {
    public static void main(String[] args) {
        // statement creating `mexBin` object goes here
    }
}
```

Assume that you have already created a `mexBin` `CoffeeBin` object. Now add a single statement to the driver that will print to the console the total value of the coffee in the `mexBin` coffee bin. (Total value is the amount in a bin times the cost per pound of coffee in that bin). Your answer should NOT include actual numbers, but instead should use methods from the `CoffeeBin` class applied to the `mexBin` object.

Enter the statement (to be placed in the driver) that prints the intended value in the box below.

```java
System.out.println("Total Value: $" + (mexBin.getAmount() * mexBin.getCost()));
```

**Question 12**
Here is the driver.

```java
public class BinDriver
{
    public static void main(String[] args)
    {
        // statements creating bin1, bin2, bin3 go here
    }
}
```

Suppose three CoffeeIn objects, called bin1, bin2 and bin3, have already been created in the driver. Add a statement or statements to the driver that prints to the console the kind of coffee that is, the kind value of the CoffeeIn object from among bin1, bin2 or bin3 that has the highest per-pound price. (In case of ties any with highest price will do).

Enter your answer in the box below:

```java
if (bin1.getCost() >= bin2.getCost() && bin1.getCost() >= bin3.getCost()) {
    System.out.println(bin1.getKind());
} else if (bin2.getCost() >= bin3.getCost()) {
    System.out.println(bin2.getKind());
} else {
    System.out.println(bin3.getKind());
}
```