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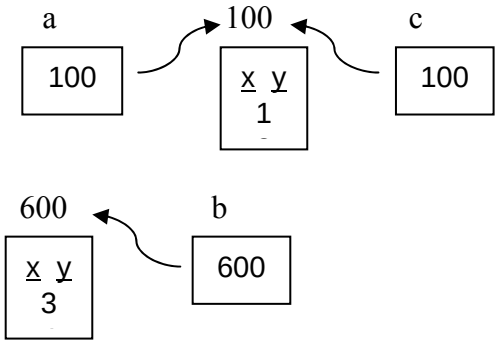
MIDTERM REVIEW+HINT FOR QUIZ 8 AND DO-WHILE LOOP:

```
public class MT
{
        int x,y;
        public MT swap ()
        {
                int temp;
                temp = x;
                x = y;
                y = temp;
        }                                  method type
        public MT copy ()
        {
                MT result = new MT (x,y);
        Return result;
        }
}
```

```
In main();
MT a,b,c;
a = new MT (1,2);
b = new  MT  (3,4);
c = a;
c.swap();
```



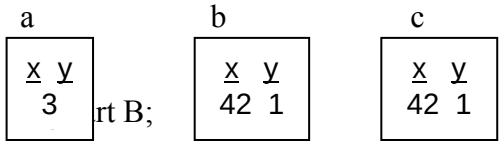

```
System.out.println("a: "+a+",b: "+b+",c: "+c);
//a:(2,1) b:(3,4) c:(2,1)
```

Since we do not generate new object, “a” and “c” refer the same object, thus if we change any of its values both of their values change.

a = b;

b = c;

b.x = 42;



rt B;

a:(3,4) b:(42,1) c:(42,1)

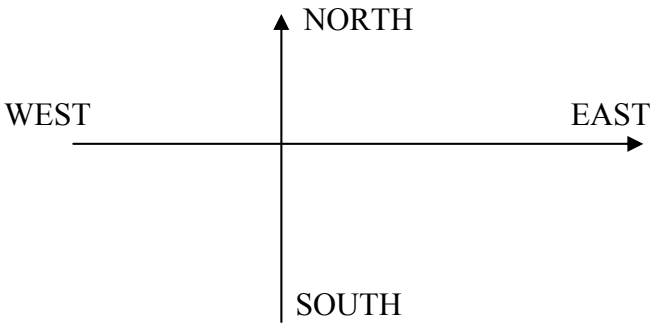
for part C;

a:(3,2) b:(2,3) c:(3,2)

for part D;

(6,18)

HINT OF QUIZ 8



Robot myRobot = new Robot (1,2,east);

```
public void turnLeft()
{
        switch(d)
        {
                case Dimension.east:
                        d = Direction.north;
                        break; ——→ for exit the loop
                case Dimension.north:
                        d = Direction.west;
```

```
                    break;
                case Dimension.west:
                    d = Direction.south;
                    break;
                case Dimension.south:
                    d = Direction.east;
                    break;
        }
}
```

HINT FOR 2. QUESTION

ex: $1+\frac{1}{2!}-\frac{1}{3!}+\frac{1}{4!}-\ldots\ldots\ldots+\frac{1}{(n-1)!}-\frac{1}{(n)!}$

Add all numbers until the last element lest than or equal to 0,001.

First write factorial() method:

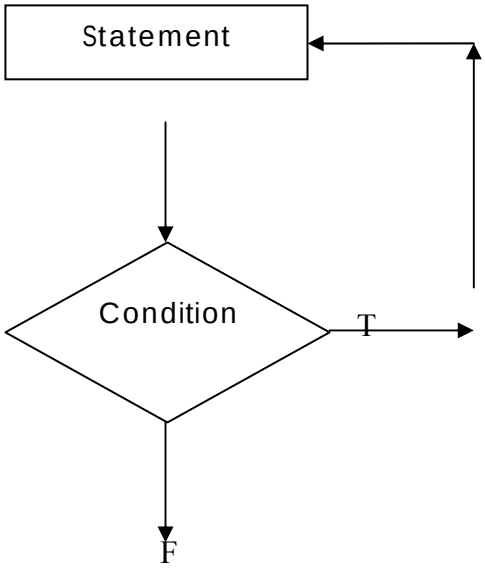
```
public int factorial(int n)
{
        int nfac = 1;
        for ( int i = 1; i <= n; i++ )
        {
                nfac = nfac*i;
                return nfac;
        }
}
```

Then find the sequence in main method:

```
public static void main (String[] args)
{
        double result = 1;
        double k = 0,001;
        for(int i =2; i<=Integer.Max_Value && k>=0,001; i++)
        {
                k=( 1.0 / factorial(i) ) – ( 1.0 / factorial(i+1) );
                result = result + k;
        }
```

```
        System.out.println(result);
}
```

DO – WHILE:



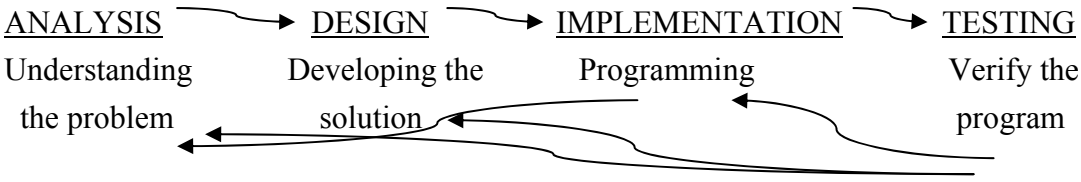
n rn
123 → [ ] → 321

```
int n = 123;

int rn =0;
int lastDigit;
do
{
        lastDigit = n % 10;
        rn = rn + lastDigit;
        n = n / 10;

} while (n>0);
System.out.println( “the reversed number is: ” + rn );
```

CHAPTER 6: OBJECT-ORIENTED DESIGN



Loops, we may go back one of the previous stages.

In Loop, the purpose of analysis is identifying the objects and their functionalities (as their responsibilities).

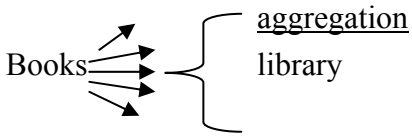
The nouns used in problem description can identify classes and objects needed in a program.

Identify the relationships among the objects (classes)

Inheritance

Dependency

Aggregation



QUESTIONS

1.) What is the difference between the while loop and the do-while loop?

Answer: A while loop evaluates the condition first. If it is true, it executes the loop body. The do loop executes the body first and then evaluates the condition. Therefore the body of a while loop is executed zero or more times, and the body of a do loop is executed one or more times.

2.)Designe and implement an implication that sums the natural number till the number that specified by the user.

Answer:

```
/**************************************************
* This program finds the sum of natural numbers
 * until the number that you enter
* @author Şerafettin ay
 * @version 1.00 07/04/26
 **************************************************/

import java.util.*;
public class Sum
{

   public static void main(String[] args)
   {
        Scanner scan = new Scanner(System.in);
       int i,n;
```

```
            int sum;
            System.out.print("Enter a value for n: ");
            n = scan.nextInt();

            sum = 0;
            i = 1;
            do
             {
               sum += i;
               i++;
             }while (i <= n);

            System.out.println("The sum of the first n natural numbers is " + sum);
        }
}// The end of class.
```

3.) Design and implement a program that implement a guessing game. The computer will guess a number and the user will guess and ask the user whether he or she want to continue or not.

Answer:

```
/*************************************************
* This is a simple guessing game with the user
 * @author Şerafettin ay
 * @version 1.00 07/04/26
 *************************************************/

import java.util.*;

public class Guessing
{

  public static void main (String[] args)
  {
    int lastNum ;
    int answer, guess;
          String response;
    Scanner scan = new Scanner (System.in);
```

```
    do{
            Random generator = new Random();
            lastNum =generator.nextInt(50)+1;
            answer = generator.nextInt(lastNum) + 1;
            System.out.print ("I'm thinking of a number between 1 and "
                        + lastNum + ". Guess what it is: ");
            guess = scan.nextInt();

            if (guess == answer)
              System.out.println ("You got it! Good guessing!");
            else
            {
              System.out.println ("That is not correct, sorry.");
              System.out.println ("The number was " + answer);
            }
            System.out.println ("If you want to continue press 'y' or 'Y' ");
            response=scan.next();
        }while(response!="Y" || response !="y");
  }
}//The end of class
```

4.) Design and implement a program that reverse the order of characters that the string entered by user.

Answer:

```
/**
 * @(#)ReverseString.java
 *
 * JFC Sample application
 *
 * @author Şerafettin ay
 * @version 1.00 07/04/26
 */

import java.util.*;

public class ReverseString
```

```
{

        public static void main(String[] args)
        {
                Scanner scan = new Scanner(System.in);
                String  firstString;
                String  isContinue;

                do
                {
                        System.out.println("Please enter a text that you want to be reversed?");
                        firstString = scan.next();
                        //used method here
                        ReverseString rvrString = new ReverseString();
                        System.out.println(rvrString.reverseString(firstString));

                        System.out.println("Continue? (y)es");
                        isContinue = scan.next();
                }while(isContinue != "y" || isContinue != "Y");
                System.out.println("goodbye!");
        }//The end of main method

        private static String reverseString(String firstString)//method that reverse the string
        {
                String reversedString = "";
                for(int allChar = firstString.length() - 1 ; allChar >= 0 ; allChar--)
                {
                        reversedString += firstString.charAt( allChar);
                }
        return reversedString;
        }
}
```

5.) Design and implement a program that gives the factorial value of entered integer.

Answer:

```
/*********************************************
 * JFC Sample application
* @author Şerafettin Ay
```

```
 * @version 1.00 07/04/27
 **********************************************/
import java.util.*;
public class Factorial
{
	public static void main(String[] args)
	{
		Scanner scan=new Scanner(System.in);
		int x;
		System.out.println("enter an integer:");
		x=scan.nextInt();
		int i=2;
		int fact=1;
		do
		{
			fact *=i;
			i++;
		}while(i<=x);
		System.out.println("factorial:" +fact);
	}
}//the end of class
```

6) What the difference is between do loop and while loop?

7) When we should prefer for loop instead of while loop?

8) Write a method which gives the sum of (x^0 + x^1 + x^2 + x^3 + ... x^n)

9) Write a do loop which gives the sum of (1 + 1/2 + 1/3 +.....1/n)

Answers

A6) while loop is first control the condition then if the condition is true, the loop statement is executed until the condition is false. The do loop is first executes the statement then control if the statement is true or not. If it is false the execution stops.

A7) We generally prefer for loop when we know how many times we execute the loop statement. We can do the same job with while also, but for is more useful and practical for this.

A8)

```
Public static int sum (int n)
{
        int sum = 1;
        int elem = 1;

        for (int i = 1; i <= n; i++)
        {
                elem = elem * x;
                sum = sum + elem;
        }
}
```

A9)

```
int i = 2;
double sum = 1;

do
{
        sum = sum + 1.0 / i;
        i++;
}
while (i <= n );
```