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SUBJECT: OOPS

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ASSIGNMENT: LAB 1

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Q.1 How to check even and odd numbers in java using object oriented approach?

Ans:

Program:

```
import java.util.Scanner;


public class EvenOdd {


    public static void main(String[] args) {


        Scanner reader = new Scanner(System.in);


        System.out.print("Enter a number: ");
        int num = reader.nextInt();


        if(num % 2 == 0)
            System.out.println(num + " is even");
        else
            System.out.println(num + " is odd");
    }
}
```

OUPTPUT:

```
compile:
run:
Enter a number: 5
5 is odd
BUILD SUCCESSFUL (total time: 8 seconds)
```

```
compile:
run:
Enter a number: 8
8 is even
BUILD SUCCESSFUL (total time: 5 seconds)
|
```

Explanation:

To check whether the given number is Odd or Even using If Statement and Conditional operator. If the number is divisible by 2, it has even number, and the remaining (not divisible by 2) are odd numbers.

Q.2: how to add 2 complex number in java using object oriented approach?

Ans:

Program:

```java
public class Complex {

  double real;
  double imag;

  public Complex(double real, double imag) {
    this.real = real;
    this.imag = imag;
  }
```

```java
    public static void main(String[] args) {

        Complex n1 = new Complex(2.3, 4.5),

            n2 = new Complex(3.4, 5.0),

            temp;


        temp = add(n1, n2);


        System.out.printf("Sum = %.1f + %.1fi", temp.real, temp.imag);

    }


    public static Complex add(Complex n1, Complex n2)

    {

        Complex temp = new Complex(0.0, 0.0);


        temp.real = n1.real + n2.real;

        temp.imag = n1.imag + n2.imag;


        return(temp);

    }

}
```

OUTPUT:

```
compile:
run:
Sum = 5.7 + 9.5i   BUILD SUCCESSFUL (total time: 2 seconds)
```

EXPLIANTAION:

In the above program, we created a class Complex with two member variables: real and image. As name suggests, real stores real part of a complex number and image stores the imaginary part.

The Complex class has a constructor with initializes the value of real and imag.

We also created a new static function add() that takes two complex numbers as parameters and returns the result as a complex number.

Inside the add() method, we just add the real and imaginary parts of complex numbers n1 and n2, store it in a new variable temp and return temp.

Then, in the calling function main(), we print it using printf() function.

Q.3 How to check Leap year in java using object oriented approach?

Ans:

Program:

```
class Leapyear
{
        public static void main(String arg[])
        {
          long a,y,c;
          Scanner sc=new Scanner(System.in);
          System.out.print("enter  any  calendar year :");
           y=sc.nextLong();
          if(y!=0)
          {
                a=(y%400==0)?(c=1):((y%100==0)?(c=0):((y%4==0)?(c=1):(c=0)));
                if(a==1)
```

```
            System.out.println(y+" is a leap year");

        else

            System.out.println(y+" is not a leap year");

    }

    else

        System.out.println("year zero does not exist ");

    }

}
```

OUTPUT:

```
compile-single:
run-single:
enter   any   calendar year :2020
2020 is a leap year
BUILD SUCCESSFUL (total time: 12 seconds)
|
```

```
compile-single:
run-single:
enter   any   calendar year :2019
2019 is not a leap year
BUILD SUCCESSFUL (total time: 7 seconds)
|
```

Explaination:

The ternary operator syntax is "if (condition)? value1:value2;", if the condition is true then it returns value1, otherwise it returns value2.

We are calculating the given year is a leap year or not. A year divisible by 400 (or) a year divisible by 4 and not divisible by 100 is a leap year.

Read the year value using scanner object sc.nextLong and store it in the variable y.

Q.4: How to check that the input from the user is the vowel or not in java using objected oriented approach?

Ans:

Program:

```
public class VowelConsonant {

    public static void main(String[] args) {

        char ch = 'i';

        if(ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' )
            System.out.println(ch + " is vowel");
        else
            System.out.println(ch + " is consonant");

    }
}
```

OUTPUT:

```
compile-single:
run-single:
Enter Alphabat:
m
m is consonant
BUILD SUCCESSFUL (total time: 1 second)
```

```
compile-single:
run-single:
Enter Alphabat:
a
a is vowel
BUILD SUCCESSFUL (total time: 2 seconds)
```

Explaintaion:

In the above program, 'i' is stored in a char variable ch. In Java, you use double quotes (" ") for strings and single quotes (' ') for characters.

Now, to check whether ch is vowel or not, we check if ch is any of: ('a', 'e', 'i', 'o', 'u'). This is done using a simple if..else statement.

Q.5 How to use power of a number in java using object oriented approach?

Ans:

Program:

```
package javaapplication12;


import java.util.Scanner;
```

```java
import java.math.*;

public class JavaApplication12 {

    public static void main(String[] args) {

        int num,num2;

        Scanner input=new Scanner(System.in);
        System.out.println("Enter number =");
        num=input.nextInt();
        System.out.println("Enter power= ");
        num2=input.nextInt();
        double power = Math.pow(num, num2);
        System.out.println("power= "+power);

    }

}
```

OUTPUT:

```
compile:
run:
Enter number =
3
Enter power=
4
power= 81.0
BUILD SUCCESSFUL (total time: 13 seconds)
```

Explanation:

In this program, base and exponent are assigned values 3 and 4 respectively.

Using the while loop, we keep on
multiplying result by base until exponent becomes zero.

In this case, we multiply result by base 4 times in total, so result = 1 * 3 * 3 * 3 * 3
= 81.