1. Write a java program to display the numbers in the Collatz series for any number?

sol:

```java
class Test
{
public static void main(String [] ar)
{
int num=2;
if(num==2){
System.out.println("2");
System.out.println("1");
System.out.println("4");
System.out.println("2");
System.out.println("1");
}
else {
System.out.println(num);
while(num!=1)
{
if(num%2==0)
{
num=num/2;
System.out.println(num);
}
else
{
num=num*3+1;
System.out.println(num);
}
}
}
}
}
```

2. Write a java program to display below loop pattern?

```
8
16 17
32 33 34 36
64 65 66 67 68 69 70 71
```

sol:

```java
class Test
{
public static void main(String[] ar)
{
int frstNum=8;
for(int i=1;i<16;i=i*2)
{
int temp=frstNum;
for(int j=1;j<=i;j++)
```

```java
{
System.out.print(temp++ +" ");
//temp++;
}
frstNum*=2;
System.out.println("");
}
}
}
```

3. Write a java program to display below loop pattern?
1
3 2
6 5 4

sol:

```java
class Test
{
public static void main(String [] ar)
{
int num=1,temp;
System.out.println(num);
for(int i=1;i<=4;i++)
{
num=num+i+1;
System.out.print(num);
temp=num;
for(int k=1;k<=i;k++)
{
System.out.print(--temp);
}
System.out.println();
}
}
}
```

4. Write a java program to check given alphabet is a vowel or not?

sol:

```java
class Test
{
public static void main(String[] ar)
{
char ch='9';

switch(ch)
{
```

```java
case 'a':
case 'b':
case 'e':
case 'i':
case 'u':
System.out.println("Is vowel");break;
default : System.out.println("Is a constant");
}


}
}
```

5. Write a java program to check given number is prime or not ?

sol:

```java
import java.util.Scanner;
class Test
{
public static void main(String[] ar)
{
Scanner s=new Scanner(System.in);
System.out.println("Enter a num");
int num=s.nextInt();
boolean isPrime=true;
for(int i = 2; i*i <= num; i=i*2) //2, 4, 16
{
if(num%i==0)
{
isPrime=false;
}
}
if(isPrime==false)
System.out.println(num +" is not a prime number");
else
System.out.println(num +" is a prime number");
}
}
```