Lesson:

Input

Pre-Requisites:

- Java Basic syntax
- Variables
- Data types

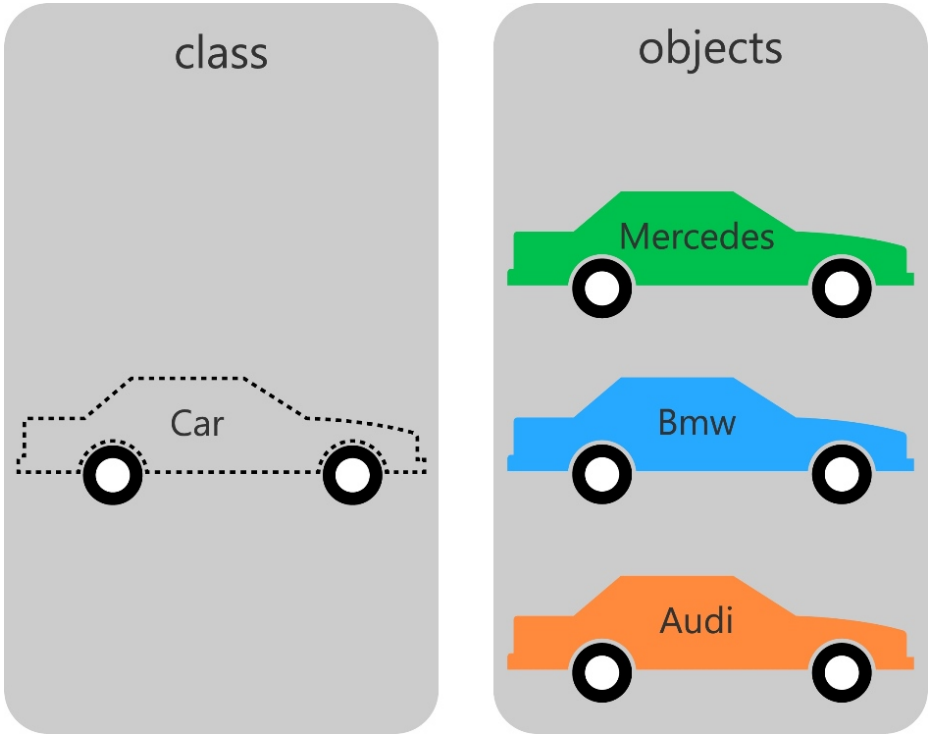
List of Concepts Involved:

- Taking input from user

Before getting into the actual input programs, lets first look into the brief description of the commonly used jargons.

Class : a class is a template definition of the methods and variables in a particular kind of object.

Object: Object is an instance of a class. It is actually a real world entity.
Lets see the example below for better understanding.



Here, you can see that class 'Car' is just a blueprint. However, the objects actually are the real world entities which have their own features.

Package: A package in Java is used to group related classes. Think of it as a folder in a file directory. We use packages to avoid name conflicts, and to write a better maintainable code.

Let us begin !

Topic: How to get input from users in Java?

The easiest way to read input (primitive) in a Java program is through scanner class.

Java Scanner Class
Java Scanner class allows the user to take input from the console. It belongs to the java.util package. It is used to read the input of primitive types like int, double, long, short, float, and byte.

The Java Scanner class then breaks the input into tokens using a delimiter (whitespace by default). It provides many ways to read and parse various primitive values.

In order to use scanner you have to write this import statement at the top –

```
import java.util.Scanner;
```

Example code for taking integer input in java

```
import java.util.Scanner;
public class Main{
     public static void main(String[] args){
          int num;
          System.out.println(“Enter a number”);
          Scanner sc = new Scanner(System.in);
          num=sc.nextInt();
          System.out.println(num);
          num=num+5;
          System.out.println(num);
     }
}
```

Example code:

```
//Code for adding two integers entered by the user
import java.util.Scanner;
class AddNumbers {
        public static void main(String args[])  {
            int num1,num2,sum;
            System.out.println("Enter two numbers to calculate their sum: ");
            // Create a Scanner
            Scanner sc = new Scanner(System.in);
            num1=sc.nextInt();
            num2 = sc.nextInt();
            sum= num1 + num2;
            System.out.println(sum);
        }
}
```

Sample Input: 10 5
Output: 15
Here, sc.nextInt() scans and returns the next token as int. A token is part of an entered line that is separated from other tokens by space, tab or newline. So when input line is: “10 5” then sc.nextInt() returns the first token i.e. “10” as int and sc.nextInt() again returns the next token i.e. “5” as int.

Example code for calculation of simple interest:

```
import java.util.Scanner;
class Main {
  public static void main(String[] args) {
  // create an object of Scanner class
    Scanner sc = new Scanner(System.in);
  // take input from users
    System.out.print("Enter the principal amount: ");
    double principal = sc.nextDouble();
    System.out.print("Enter the interest rate: ");
    double rate = sc.nextDouble();
    System.out.print("Enter the time: ");
    double time = sc.nextDouble();
    double interest = (principal * time * rate) / 100;
    System.out.println("Principal: " + principal);
    System.out.println("Interest Rate: " + rate);
    System.out.println("Time Duration: " + time);
    System.out.println("Simple Interest: " + interest);
  }
}
```

Output:

Enter the principal: 500
Enter the rate : 8
Enter the time: 2
Principal :500.00
Interest Rate: 8.0
Time Duration: 2.0
Simple Interest : 80.0

```
// Java program to read character using Scanner class
import java.util.Scanner;
public class Main
{
         public static void main(String[] args)
 {       // Declare the object and initialize with
  // predefined standard input object
  Scanner sc = new Scanner(System.in);
                    // Character input
  char ch = sc.next().charAt(0);
                  // Print the read value
  System.out.println("char  = "+ch);
 }
}
```

Input :

h
Output :
char = h

Java Scanner Methods to Take Input

The Scanner class provides various methods that allow us to read inputs of different types. Lets see a few of them in the table below :

Method	Description
nextInt()	reads an int value from the user
nextFloat()	reads a float value form the user
nextBoolean()	reads a boolean value from the user
nextLine()	reads a line of text from the user
next()	reads a word from the user
nextByte()	reads a byte value from the user
nextDouble()	reads a double value from the user
nextShort()	reads a short value from the user
nextLong()	reads a long value from the user

Try and explore all of these scanner methods in the same way as we did in the previous examples. This will make you an expert with scanner method applications.

MCQs

1.What is the output of the following code if input is :
20 physics wallah

```
Scanner s = new Scanner(System.in);
int p = s.nextInt();
String q = s.next();
System.out.print(p);
System.out.println(q);
```

Options

a. 20 physics wallah
b. 20physics
c. 20physicswallah
d. 20 physics

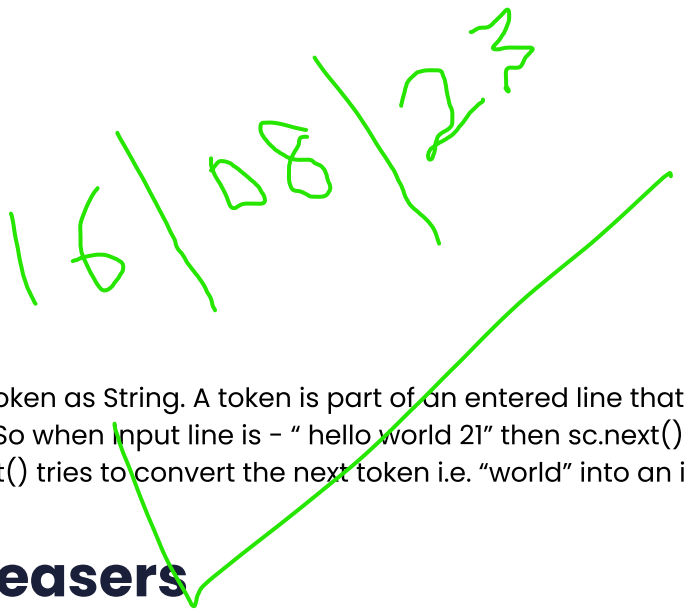
Ans: b) 20physics
Explanation:
"s.nextInt()" scans and returns the next token as int. A token is part of an entered line that is separated from other tokens by space, tab or newline. So when input line is - "20 physics wallah" then s.nextInt() returns the first token as int i.e. "20" and s.next() returns the next token "physics".
While printing, in the first statement p is printed and then q. There is no space or nextline between both prints. Hence output is : 20physics.

2.What is the output of the following code if input is : hello world 21

```
Scanner sc = new Scanner(System.in);
String p = sc.next();
int q=sc.nextInt();
System.out.print(p + " " + q);
```

Options:

a. hello world 21
b. InputMismatchException
c. hello 21
d. hello



Ans b) InputMismatchException
Explanation:
"sc.next()" scans and returns the next token as String. A token is part of an entered line that is separated from other tokens by space, tab or newline. So when input line is - " hello world 21" then sc.next() returns the first token as String i.e. "hello" and sc.nextInt() tries to convert the next token i.e. "world" into an int, which gives InputMismatchException.

Upcoming Class Teasers

- Operators
- Precedence and their associativity