

Introduction to variables and comparison operators

❖ Scanner

- The Scanner class of the java.util package is used to read input data from different sources like input streams, users, files, etc. Let's take an example.

Example 1: Read a Line of Text Using Scanner

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {

        // creates an object of Scanner
        Scanner input = new Scanner(System.in);

        System.out.print("Enter your name: ");

        // takes input from the keyboard
        String name = input.nextLine();

        // prints the name
        System.out.println("My name is " + name);

        // closes the scanner
        input.close();
    }
}
```

Output

```
Enter your name: Krishna
My name is Krishna
```

- ❖ In the above example, notice the line

```
Scanner input = new Scanner(System.in);
```

- Here, we have created an object of Scanner named input.
- The System.in parameter is used to take input from the standard input. It works just like taking inputs from the keyboard.
- We have then used the nextLine() method of the Scanner class to read a line of text from the user.

● Import Scanner Class

- ❖ As we can see from the above example, we need to import the java.util.Scanner package before we can use the Scanner class.

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

Example 2: Java Scanner nextInt()

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {

        // creates a Scanner object
        Scanner input = new Scanner(System.in);

        System.out.println("Enter an integer: ");

        // reads an int value
        int data1 = input.nextInt();

        System.out.println("Using nextInt(): " + data1);

        input.close();
    }
}
```

Output

```
Enter an integer: 29
Using nextInt(): 29
```

Example 3: Java Scanner next()

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {

        // creates an object of Scanner
        Scanner input = new Scanner(System.in);
        System.out.print("Enter your name: ");

        // reads the entire word
        String value = input.next();
        System.out.println("Using next(): " + value);

        input.close();
    }
}
```

Output

```
Enter your name: Krishna Madan
Using next(): Krishna
```

- In the above example, we have used the next() method to read a string from the user.
- Here, we have provided the full name. However, the next() method only reads the first name.
- This is because the next() method reads input up to the whitespace character. Once the whitespace is encountered, it returns the string (excluding the whitespace).

Example 4: Java Scanner nextLine()

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {

        // creates an object of Scanner
        Scanner input = new Scanner(System.in);
        System.out.print("Enter your name: ");

        // reads the entire line
        String value = input.nextLine();
```

```
System.out.println("Using nextLine(): " + value);

input.close();
}
}
```

Output

```
Enter your name: Krishna Madan
Using nextLine(): Krishna Madan
```

- In the first example, we have used the `nextLine()` method to read a string from the user.
- Unlike `next()`, the `nextLine()` method reads the entire line of input including spaces. The method is terminated when it encounters a next line character, `\n`.

❖ Variables

➤ Int and double data types

Int Data Type

- The `int` data type is a 32-bit signed two's complement integer. Its value-range lies between $-2,147,483,648$ (-2^{31}) to $2,147,483,647$ ($2^{31} - 1$) (inclusive). Its minimum value is $-2,147,483,648$ and maximum value is $2,147,483,647$. Its default value is `0`.
- The `int` data type is generally used as a default data type for integral values unless there is no problem about memory.

Example:

```
int a = 100000, int b = -200000
```

Double Data Type

- The double data type is a double-precision 64-bit IEEE 754 floating point. Its value range is unlimited. The double data type is generally used for decimal values just like float. The double data type also should never be used for precise values, such as currency. Its default value is 0.0d.

Example:

```
double d1 = 12.3
```

➤ Boolean data type

- In Java, the boolean keyword is a primitive data type. It is used to store only two possible values, either true or false. It specifies 1-bit of information and its "size" can't be defined precisely.
- The boolean keyword is used with variables and methods. Its default value is false. It is generally associated with **conditional statements** (which will be discussed on day 4).

Example:

```
Boolean one = false
```

❖ Comparison Operators

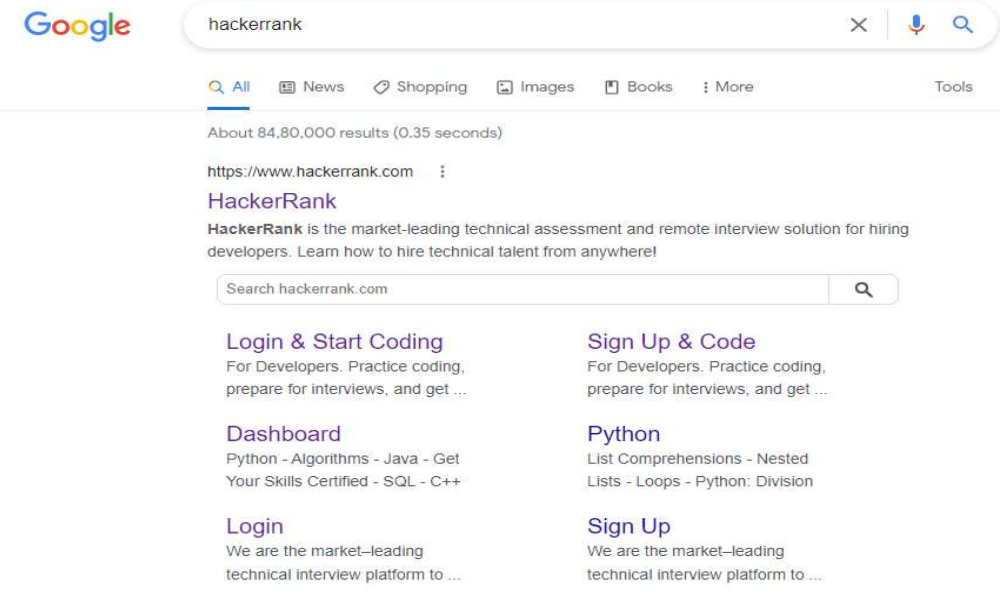
You may be familiar with comparison operators from maths class. Let's make sure there aren't any gaps in your knowledge.

- Less than (<) — returns true if the value on the left is less than the value on the right, otherwise it returns false.
- Greater than (>) — returns true if the value on the left is greater than the value on the right, otherwise it returns false.
- Less than or equal to (<=) — returns true if the value on the left is less than or equal to the value on the right, otherwise it returns false.

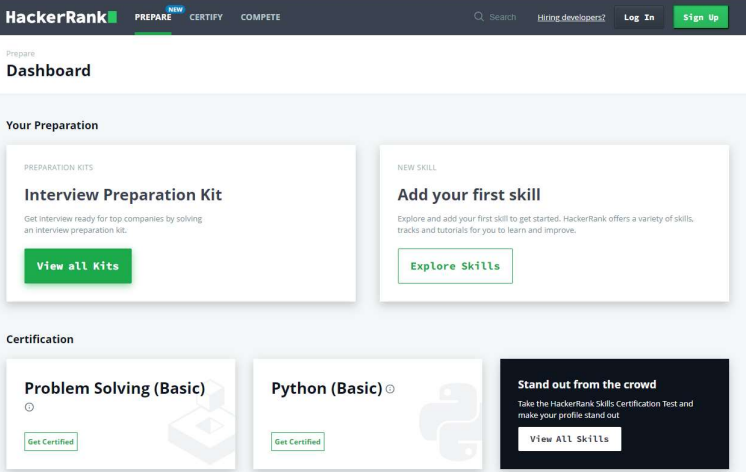
- Greater than or equal to (\geq) — returns true if the value on the left is greater than or equal to the value on the right, otherwise it returns false.
- Equal to ($==$) — returns true if the value on the left is equal to the value on the right, otherwise it returns false.
- Not equal to (\neq) — returns true if the value on the left is not equal to the value on the right, otherwise it returns false.

❖ Hackerrank Familiarity

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Jul 8 2022, 12:00 am IST

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```

1 // You are given a string s and a string t.
2 // You have to find the minimum number of characters
3 // to be added to s to make it a palindrome.
4 // Note: You are not allowed to delete any character from s.
5 // You are only allowed to add characters at the end of s.
6 // Example:
7 // s = "abcd"
8 // t = "dcb"
9 // Output: 2
10 // Explanation:
11 // We can add 'a' and 'b' at the end of s to make it a palindrome.
12 // The resulting string is "abcdab".
13 // The minimum number of characters to be added is 2.
14 // Constraints:
15 // 1 <= s.length <= 1000
16 // 1 <= t.length <= 1000
17 // s and t consist of lowercase alphabets only.
18 // Time complexity: O(n^2)
19 // Space complexity: O(n)

```

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Questions to be done in the class

- 1) Input two integers (store them in an int variable) and find their sum and difference.

```
Step 1. Start
Step 2. Declare Variable names x,y with 'int data type'.
Step 3. Assign Values of x and y.
Step 4. Print/Display (x+y) and (x-y).
Step 5. Stop
```

- 2) Take two integer inputs and store them in variables x and y where x is length and y is breadth
 - a. Calculate Area of Rectangle
 - b. Find perimeter of rectangle

```
Step 1. Start
Step 2. Declare Variable names x,y with 'int data type'.
Step 3. Assign Values of x and y.//x is length and y is breadth
Step 4. Print/Display area=(x*y) and perimeter=2*(x+y).
Step 5. Stop
```


- 3) Write a program to convert Fahrenheit into Celsius. Take Fahrenheit value in a double variable and print the answer in Celsius.

```
Step 1. Start
Step 2. Declare Variable names fahren with 'double data type'.
Step 3. Assign Values of fahren.
Step 4. Print/Display celsius=(f-32)*(double)(5/9).
Step 5. Stop
```

- 4) Take two integers as inputs and add the last digits of those numbers and then print the final output. Eg x=2345 and y=4567, the last digit of 2345 i.e 5 and last digit of 4567 i.e 7, the result should then be 5+7 which gives 12.

```
Step 1. Start
Step 2. Declare Variable names x,y,z and w with 'int data type'.
Step 3. Assign Values of x and y.
Step 4. z=x%10,w=y%10.
Step 5. Print/Display (z+w).
Step 6. Stop
```

- 5) Find the answer of the following expressions

- a. `int x=2+3`
- b. `int x =3+8-29`
- c. `int x =4 + 5.2 - 8.3 + 9.2` //Tell them about the error of lossy conversion
- d. `double x =4.1 + 8.9 + 3.5`
- e. `int x= 4 * 3 / 8 + 2.5 * 2` //Tell them about the error of lossy conversion
- f. `double x=22 + 4 * 2`
- g. `double x=8 / 5 + 13 / 2`
- h. `double x=8.0/5 + 13/2`
- i. `double x=8.0/5 + 13.0/2`
- j. `int x= 392 / 10 % 10 / 2`
- k. `int x= 39%2*3`

```
Step 1. Start
Step 2. Declare Variable names x with 'int/double data type'.
```

```
Step 3. Assign Values of x according to given expressions .  
Step 4. Print/Display x.  
Step 5. Stop
```

6) Find what would get printed for the following

- a. `System.out.println(22 + 4 * 2)`
- b. `System.out.println(8 / 5 + 13 / 2)`
- c. `System.out.println(8.0/5 + 13/2)`
- d. `System.out.println(8.0/5 + 13.0/2)`

```
Step 1. Start  
Step 2. Print/Display (??).// ??->given expressions in the  
question  
Step 3. Stop
```

7) Store these expressions inside a Boolean variable ans. Print their outputs true or false accordingly

- a. Eg. `boolean ans = 2+3>5`, then `System.out.println(ans)`
- b. `40+5 > 72`
- c. `78+93 >= 100`
- d. `40+3 < 50`
- e. `90+91 <= 181`
- f. `5==5`
- g. `15==20`
- h. `15==3*5`
- i. `15==3*6`
- j. `3!=3`
- k. `4!=10`
- l. `3*4 + 8*9 == 45`
- m. `2*3 + 4*5 != 5*4 + 7/5`
- n. `13/2==13.0/2`
- o. `15.0/2 + 7 == 14.5`

```
Step 1. Start  
Step 2. Declare Variable names ans with 'boolean data type'.  
Step 3. Assign Values of ans according to given expressions .  
Step 4. Print/Display ans.
```

Step 5. Stop

- 8) Take an input x and check if the entered number is greater than 100 or not. Print true or false.

```
Step 1. Start
Step 2. Declare Variable names x with 'int data type'.
Step 3. Assign Values of x.
Step 4. if(x is greater than 100)
Step 5. then,Print/Display "True".
Step 6. else,
Step 7. Print/Display "False".
Step 8. Stop
```

- 9) Take three inputs and check if the sum of these is smaller than 150 or not. Print true or false.

```
Step 1. Start
Step 2. Declare Variable names x,y,z and sum=0 with 'int data type'.
Step 3. Assign Values of x,y and z.
Step 4. sum=x+y+z.
Step 5. if(sum is smaller than 150)
Step 6. then,Print/Display "True".
Step 7. else,
Step 8. Print/Display "False".
Step 9. Stop
```

- 10) Take four inputs x, y, z, w and check if $x*y$ is equal to $z*w$ or not. Print true or false.

```
Step 1. Start
Step 2. Declare Variable names x,y,z and w with 'int data type'.
Step 3. Assign Values of x,y,z and w.
Step 4. if((x*y) is equal to (y*w))
Step 5. then,Print/Display "True".
Step 6. else,
Step 7. Print/Display "False".
Step 8. Stop
```

- 11) Take an input and check if the number is even or not. Print true or false.

```
Step 1. Start
Step 2. Declare Variable names x with 'int data type'.
Step 3. Assign Values of x.
Step 4. if((x%2) is equal to 0)
Step 5. then,Print/Display "True".
Step 6. else,
Step 7. Print/Display "False".
Step 8. Stop
```

Homework Questions

- 1) Take the diameter of a circle as input. Print the area of the circle as integer input.
- 2) Take the base and height of a triangle as input and store them in double variables x and y and print its area.
- 3) Take an input x, check if it is greater than 1000 or not. Print true or false.
- 4) For 3rd and 4th Question. Attempt the Quiz
<https://forms.gle/bJCRD9hTR3PzZ4uN6>
- 5) Find the answer of the following expressions
 - a. Int x = 7+3+4
 - b. Int x = 12 + 5 + 8
 - c. Int x= 13/5 + 18/8
 - d. double x= 12 + 5.0 + 2.76
 - e. double x= 12/3 + 13/2
 - f. double x=12/3 + 13.0/2
 - g. double x=14/2 + 15.0/4
 - h. double x= 13/2 % 5/3
 - i. double x= 17.0/2 % 16.0/4

- 6) Store these expressions inside a Boolean variable ans. Print their outputs true or false accordingly
- a. `boolean ans = 3 > 2`
 - b. `boolean ans = 3 ≥ 3`
 - c. `boolean ans = 4 + 3 > 9`
 - d. `boolean ans = 10 + 8 > 10`
 - e. `boolean ans = 12 != 10`
 - f. `boolean ans = 13 == 13`
 - g. `boolean ans = 14 != 14`
 - h. `boolean ans = 20 == 5*4`
 - i. `boolean ans = 30 != 3+4-10`
 - j. `boolean ans = 20 == 41/2`
- 7) Take marks of a student in five subjects as input in a double variable. Print the sum of total marks and also find the percentage of the student.
- 8) Take four integer inputs and check if the product of them is greater than 1000 or not. Print true or false accordingly.
- 9) Take an integer input and check if the number is divisible by 7 or not.