



## Java Lab

### Input using the Scanner class

**IMPORTANT!** Save all your work to a safe location such as oneDrive.

Create a folder for SDPD into which you will save all your work for this module, arranged how you wish. Ideally you should create a folder each week for your lab exercises. Note that you should create a separate file for each exercise.

# Exercise 1

**Goal:** Create a program in Java using TextPad that contains an int variable. Ensure it compiles and runs successfully. Using the Scanner class, prompt the user to input a number, then output the number entered to the console.

1. Create a new file called JavaScanner1 for this exercise.

Following the guide below, create a program that has the following specification:

- Import the java.util.Scanner:

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

- Create an instance of the Scanner object:

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

- Write Java statements that declare the following variable: *number1* of type int

- Write Java statements that will prompt the user to enter an integer via the console:

```
number1 = keyboard.nextInt();
```

- Write a Java statement that will output the number the user entered

- The output should be similar to as shown below:

Amend your code so that when the program runs, a message is displayed to the user to enter an integer:

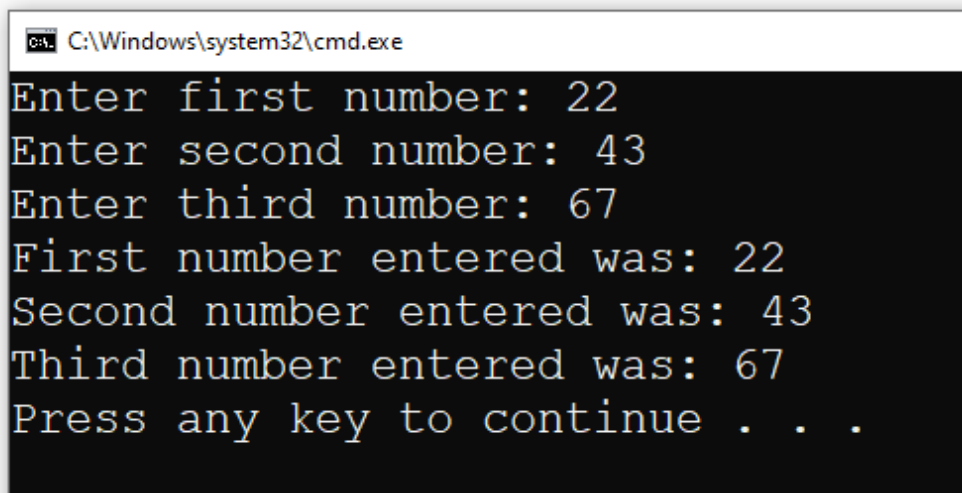
## Exercise 2

**Goal:** Create a program in Java that contains three integer variables. Ensure it compiles and runs successfully. Using the Scanner class, prompt the user to input 3 integer numbers, then output the numbers entered to the console.

Create a new file called JavaScanner2 for this exercise.

Following the guide below, create a program that has the following specification:

- Write Java statements that declare the following variables: *num1*, *num2*, and *num3* of type *int*.
- Compile and run your program. Your output should be similar to as shown below:



```
C:\Windows\system32\cmd.exe
Enter first number: 22
Enter second number: 43
Enter third number: 67
First number entered was: 22
Second number entered was: 43
Third number entered was: 67
Press any key to continue . . .
```

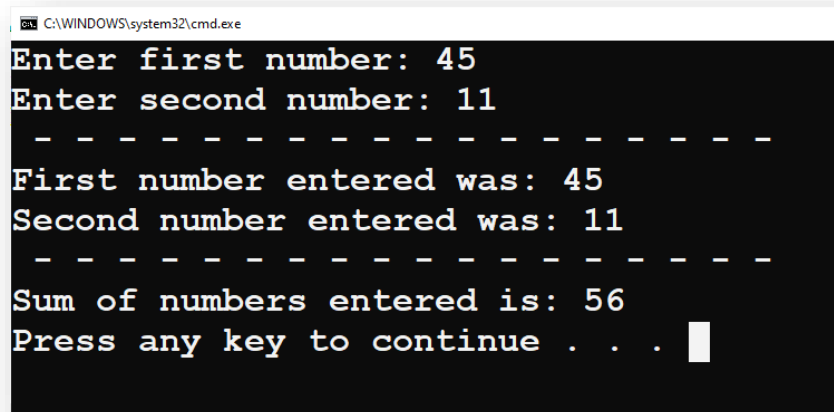
## Exercise 3

**Goal:** Create a program in Java that calculates the sum of two integer variables that will be input by the user. Ensure it compiles and runs successfully.

Create a new file called JavaScanner3 for this exercise.

Following the guide below, create a program that has the following specification:

- Write Java statements that declare the following variables:
  - *num1* as an int
  - *num2* as an int
- Compile and run your program. Your output should be similar to as shown below, showing the sum of both numbers entered:



```
C:\WINDOWS\system32\cmd.exe
Enter first number: 45
Enter second number: 11
- - - - -
First number entered was: 45
Second number entered was: 11
- - - - -
Sum of numbers entered is: 56
Press any key to continue . . .
```

Amend your code so that the program also outputs the average of the two numbers entered.

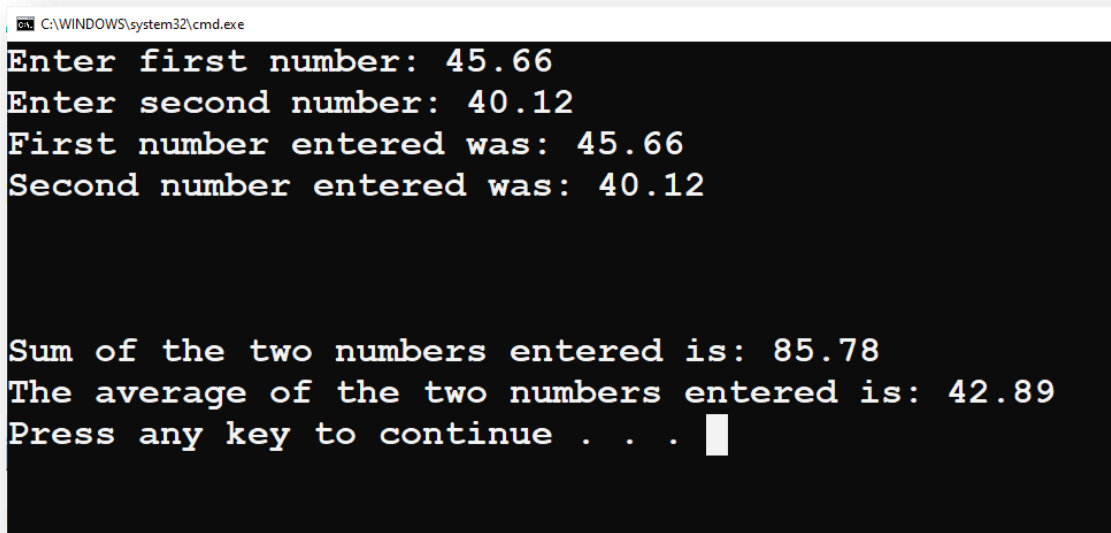
## Exercise 4

**Goal:** Create a program in Java calculating the sum of two double variables that will be input by the user. Ensure it compiles and runs successfully.

Create a new file called JavaScanner4 for this exercise.

Following the guide below, create a program that has the following specification:

- Write Java statements that declare the following variables:
  - *num1* as a double
  - *num2* as a double
- Compile and run your program. Your output should be similar to as shown below, showing the sum of both numbers entered:



```
C:\WINDOWS\system32\cmd.exe
Enter first number: 45.66
Enter second number: 40.12
First number entered was: 45.66
Second number entered was: 40.12

Sum of the two numbers entered is: 85.78
The average of the two numbers entered is: 42.89
Press any key to continue . . .
```

Amend your code so that the program also outputs the average of the two numbers entered.

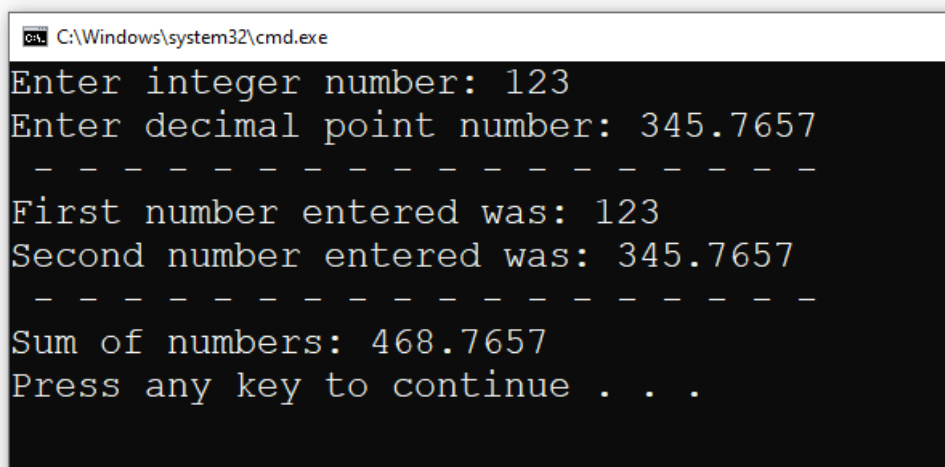
## Exercise 5

**Goal:** Create a program in Java calculating the sum of two mixed variables that will be input by the user. Ensure it compiles and runs successfully.

Create a new file called JavaScanner3 for this exercise.

Following the guide below, create a program that has the following specification:

- Write Java statements that declare the following variables:
  - *num1* as an int
  - *num2* as a double
- Compile and run your program. Your output should be similar to as shown below, showing the sum of both numbers entered:



```
C:\Windows\system32\cmd.exe
Enter integer number: 123
Enter decimal point number: 345.7657
- - - - -
First number entered was: 123
Second number entered was: 345.7657
- - - - -
Sum of numbers: 468.7657
Press any key to continue . . .
```

Amend your code so that the program also outputs the average of the two numbers entered.

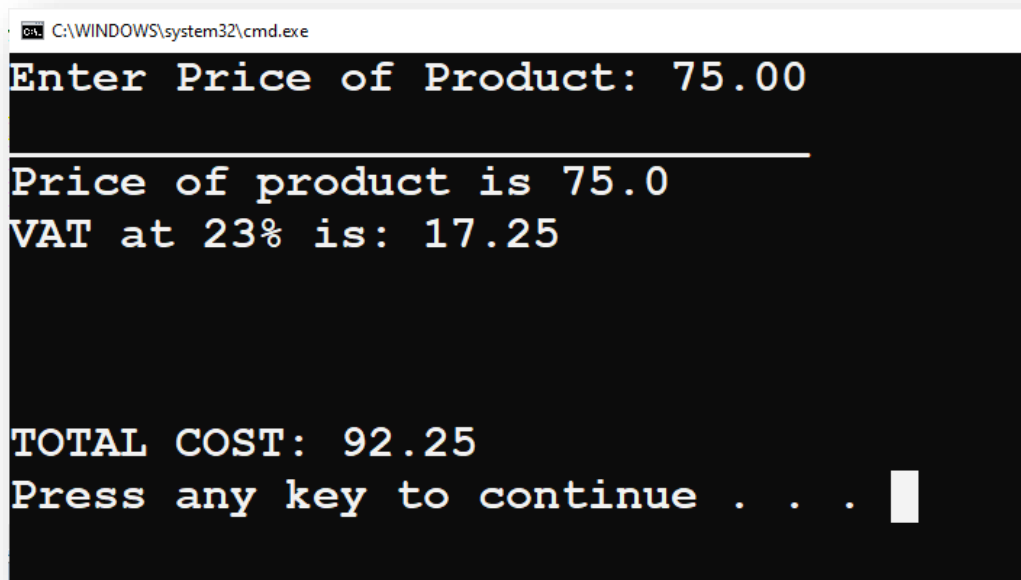
## Exercise 6

**Goal:** Create a program in Java calculating the cost of VAT based on a price entered by the user.  
**Ensure it compiles and runs successfully.**

Create a new file called JavaScanner6 for this exercise.

Following the guide below, create a program that has the following specification:

- Write Java statements that declare the following variables:
  - *price* as a double
  - *vat* as a double (assuming that the rate of VAT is 23%)
  - *finalPrice* as a double (this will be the price plus the VAT)
- Compile and run your program. Your output should be similar to as shown below, showing the sum of both numbers entered:



```
C:\WINDOWS\system32\cmd.exe
Enter Price of Product: 75.00
-----
Price of product is 75.0
VAT at 23% is: 17.25

TOTAL COST: 92.25
Press any key to continue . . .
```

## Exercise 7

**Goal:** Create a calculator program in Java that will perform addition, subtraction, division and multiplication based on two numbers entered by the user. Ensure it compiles and runs successfully.

Create a new file called JavaScanner7 for this exercise.

Your program should allow the user to enter numbers that include decimal points. Your output should be similar to as shown below, showing the following results:

```
C:\WINDOWS\system32\cmd.exe
Enter first number: 22.75
Enter second number: 13.1

Number 1 + number 2 is: 35.85
Number 1 - number 2 is: 9.65
Number 1 / number 2 is: 1.7366412213740459
Number 1 * number 2 is: 298.025

Press any key to continue . . .
```

```
C:\WINDOWS\system32\cmd.exe
Enter first number: 50.15
Enter second number: 30.25

50.15 + 30.25 is: 80.4
50.15 - 30.25 is: 19.9
50.15 / 30.25 is: 1.6578512396694214
50.15 * 30.25 is: 1517.0375

Press any key to continue . . .
```



## Exercise 8

**Goal:** Create a program in Java that prompts the user to input their name and displays a sentence based on the input.

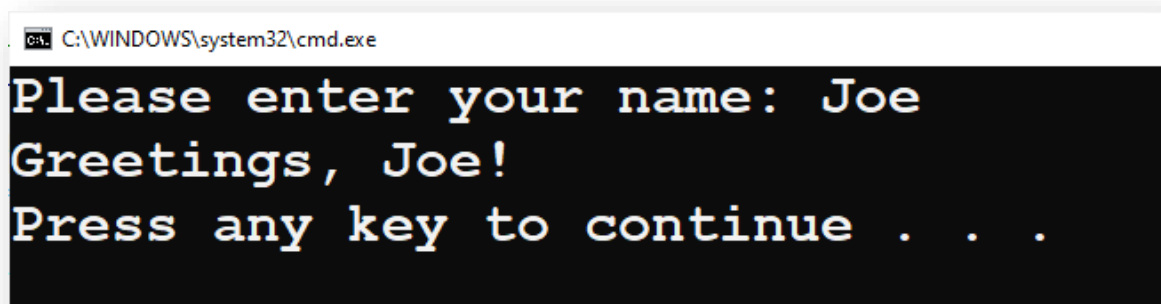
1. Create a new file called JavaScanner8 for this exercise.

Note that this program will allow the user to enter a string into the console. The *nextLine()* method (on line 17 below) will store what is entered by the user to the string variable called name).

Create the following a program:

```
1  import java.util.Scanner;
2
3  public class JavaScanner8 {
4      public static void main(String[] args)
5      {
6
7          //Create instance of Scanner object
8          Scanner keyboard = new Scanner(System.in);
9
10         //Declare a string variable called name
11         String name;
12
13         //Prompt the user to enter their name
14         System.out.print("Please enter your name: ");
15
16         //Store what is typed to the variable created in line 11
17         name = keyboard.nextLine();
18
19         //Output to the console displaying greeting
20         System.out.println("Greetings, " + name + "! ");
21     }
22 }
```

Ensure that this generates the output as shown below:



The screenshot shows a Windows command prompt window with the title bar "C:\WINDOWS\system32\cmd.exe". The output of the Java program is displayed in a monospaced font: "Please enter your name: Joe", "Greetings, Joe!", and "Press any key to continue . . .".

## Exercise 9

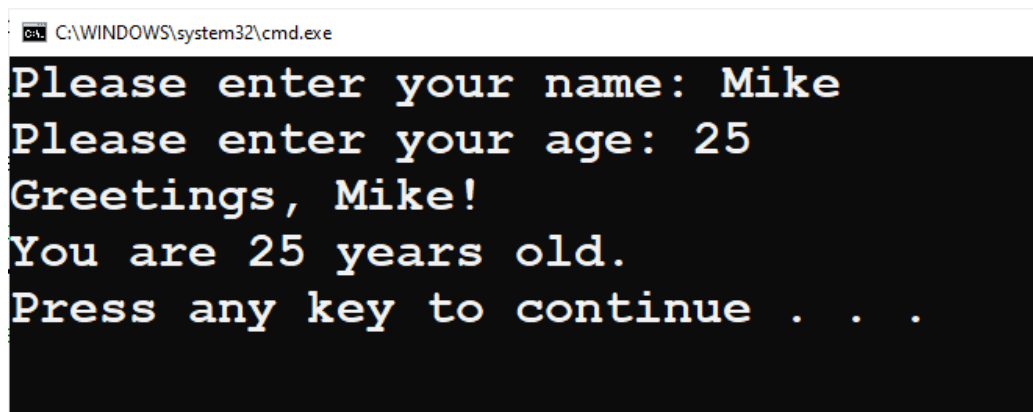
**Goal:** Create a program in Java that prompts the user to input their name and age, and displays a sentence based on the input.

1. Create a new file called JavaScanner9 for this exercise.

Your program should allow the user to enter 2 values, saved at the following data types:

- Their name (as a String)
- Their age (as an int)

Your program should produce output similar to as shown below:



```
C:\WINDOWS\system32\cmd.exe
Please enter your name: Mike
Please enter your age: 25
Greetings, Mike!
You are 25 years old.
Press any key to continue . . .
```

## Exercise 10

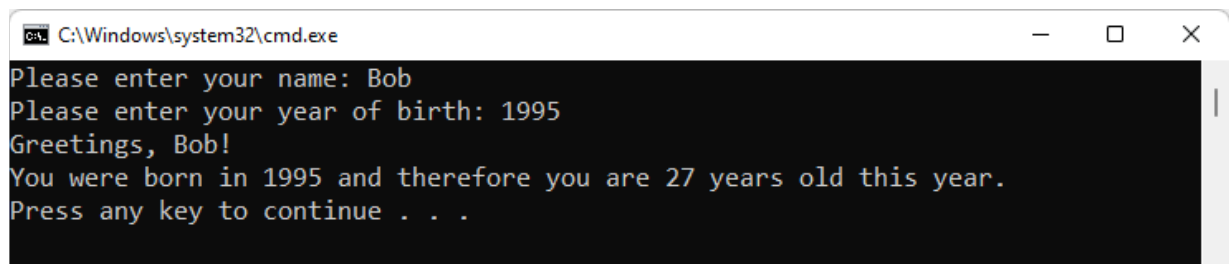
**Goal: Create a program in Java that prompts the user to input their name and their year of birth, and displays a sentence based on the input.**

1. Create a new file called JavaScanner10 for this exercise.

Your program should allow the user to enter 2 values, saved at the following data types:

- Their name (as a String)
- Their year of birth (as an int)

Your program should produce output similar to as shown below:



```
C:\Windows\system32\cmd.exe
Please enter your name: Bob
Please enter your year of birth: 1995
Greetings, Bob!
You were born in 1995 and therefore you are 27 years old this year.
Press any key to continue . . .
```

# Exercise 11

**Goal:** Create a program in Java that allows input from the keyboard. The program should generate a payslip based on the information provided by the user, calculating both annual and monthly take home pay. Ensure it compiles and runs successfully.

Create a new file called JavaScanner11 for this exercise.

Following the guide below, create a program that has the following specification:

- Prompts the user to enter a first name
- Prompts the user to enter a surname name
- Prompts the user to enter a user ID
- Prompts the user to enter a salary
- Compile and run your program. Your output should be similar to as shown below. PRSI (tax) is 35% of the entered salary. This is deducted from the salary amount and what remains is the take home.

```
C:\WINDOWS\system32\cmd.exe

Enter first name: Margaret
Enter surname: Hamilton
Enter employee ID: 456123
Enter Salary: 30000

|-----|
|  PAYSLIP  |
|-----|
| EMPLOYEE: Margaret Hamilton |
| ID: 456123 |
|
| SALARY: 30000.0 |
| PRSI: 10500.0 |
| ANNUAL TAKE HOME: 19500.0 |
| MONTHLY TAKE HOME: 1625.0 |
|-----|
Press any key to continue . . .
```

Amend your code so that the tax rate is entered by the user, eg:

```
C:\WINDOWS\system32\cmd.exe

Enter first name: Margaret
Enter surname: Hamilton
Enter employee ID: 456123
Enter Salary: 30000
Enter current tax rate: 25

|-----|
|  PAYSLIP  |
|-----|
| EMPLOYEE: Margaret Hamilton |
| ID: 456123 |
|
| SALARY: 30000.0 |
| PRSI: 7500.0 |
| ANNUAL TAKE HOME: 22500.0 |
| MONTHLY TAKE HOME: 1875.0 |
|-----|
Press any key to continue . . .
```

## Exercise 12

**Goal:** Create a program in Java that allows input from the keyboard. The program should calculate the number of people per square kilometer. Ensure it compiles and runs successfully.

Create a new file called JavaScanner12 for this exercise.

Following the guide below, create a program that has the following specification:

- Prompts the user to enter a country name
- Prompts the user to enter the country population
- Prompts the user to enter the size of the country in square kilometers
- Output the number of people per square kilometer:

```
C:\WINDOWS\system32\cmd.exe
Popluation density calculator
-----
Enter country name: Ireland
Enter country population: 4818690
Enter country area in square KM: 69825
-----
Ireland has 69 people per square kilometer.

Press any key to continue . . .
```

or

```
C:\WINDOWS\system32\cmd.exe
Popluation density calculator
-----
Enter country name: Bolivia
Enter country population: 11353142
Enter country area in square KM: 1098581
-----
Bolivia has 10 people per square kilometer.

Press any key to continue . . .
```

Test your program with the following and complete the table:

| Country   | Population    | Area km <sup>2</sup> | People per km <sup>2</sup> |
|---|---------------|----------------------|----------------------------|
|  <a href="#">China *</a>         | 1,427,647,786 | 9,596,961            | 149                        |
|  <a href="#">India *</a>         | 1,352,642,280 | 3,287,263            | 411                        |
|  <a href="#">United States *</a> | 327,096,265   | 9,629,091            | 34                         |
|  <a href="#">Indonesia *</a>     | 267,670,543   | 1,910,931            |                            |
|  <a href="#">Pakistan *</a>      | 212,228,286   | 796,095              |                            |
|  <a href="#">Brazil *</a>       | 209,469,323   | 8,514,877            |                            |
|  <a href="#">Nigeria *</a>     | 195,874,685   | 923,768              |                            |
|  <a href="#">Bangladesh *</a>  | 161,376,708   | 147,570              |                            |
|  <a href="#">Russia *</a>      | 145,734,038   | 17,098,246           |                            |
|  <a href="#">Japan *</a>       | 127,202,192   | 377,930              |                            |