THE UNIVERSITY OF
MELBOURNE

Workshop 2 （lab2）

COMP90041 Programming and software development

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Workshop will start at 11:05

Before the workshop

- Attend Lectures & Tutorials remotely

- ZOOM   chat & microphone & raise hand

- download Lab2(week3) on canvas

Operations - for numbers

+ -* / % < <= > >= == !=

%: remainder operator

eg: 10 % 3 = 1

== is a comparison while = is an assignment

```
if (x == 0)?
int x = 0;
```

Operations - for String

\n = newline (end current line), \r – return (go to start of line), \b = backspace, \t = tab character

- Include double-quote in a string by preceding with backslash (\ )

- Include a backslash in a string by preceding with backslash

demo1

print <u>I think “\” is funny</u>

printf – formatted output

- Form:

```
System.out.printf(format-string, args...);
```

- *E.g.*:

```
System.out.printf("Average:  %5.2f", average);
```

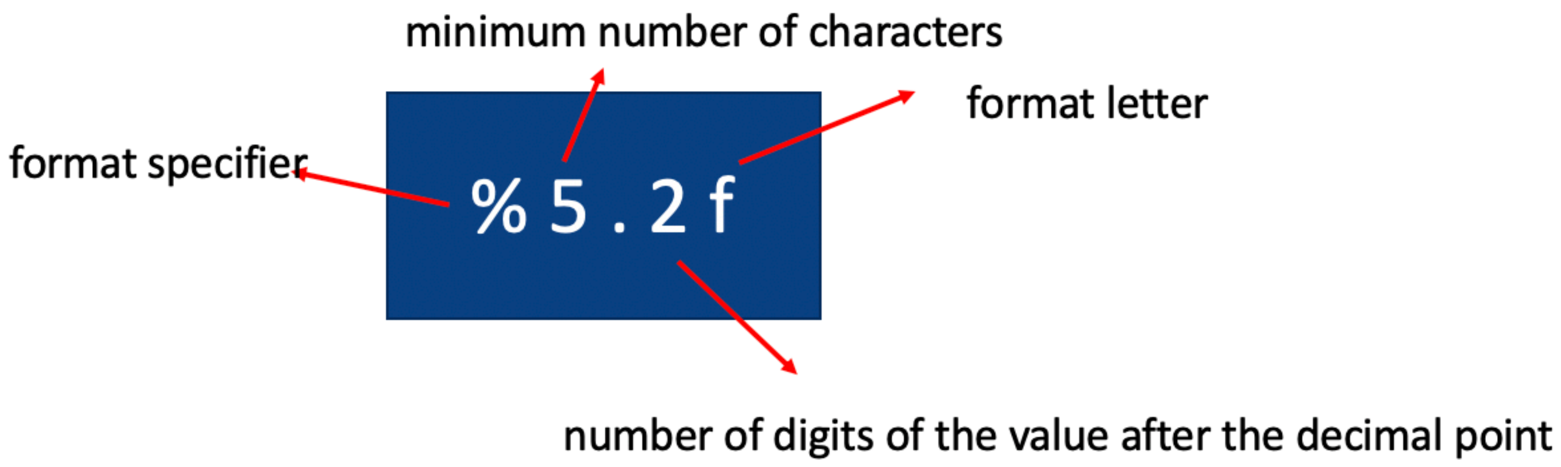
  - If the number if negative, the value will be left-justified, otherwise right-justified

demo2

x =5.7889

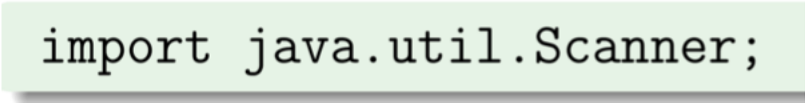
print as

5.78

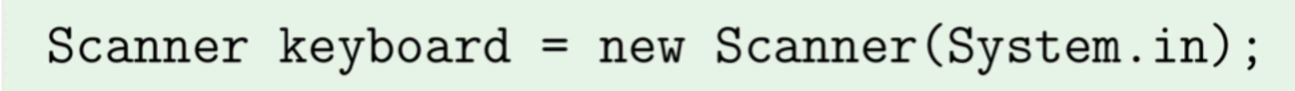


minimum number of characters
format letter
format specifier
% 5 . 2 f
number of digits of the value after the decimal point

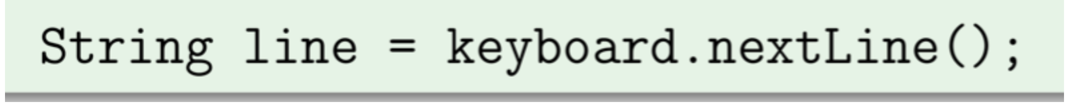
Reading console input



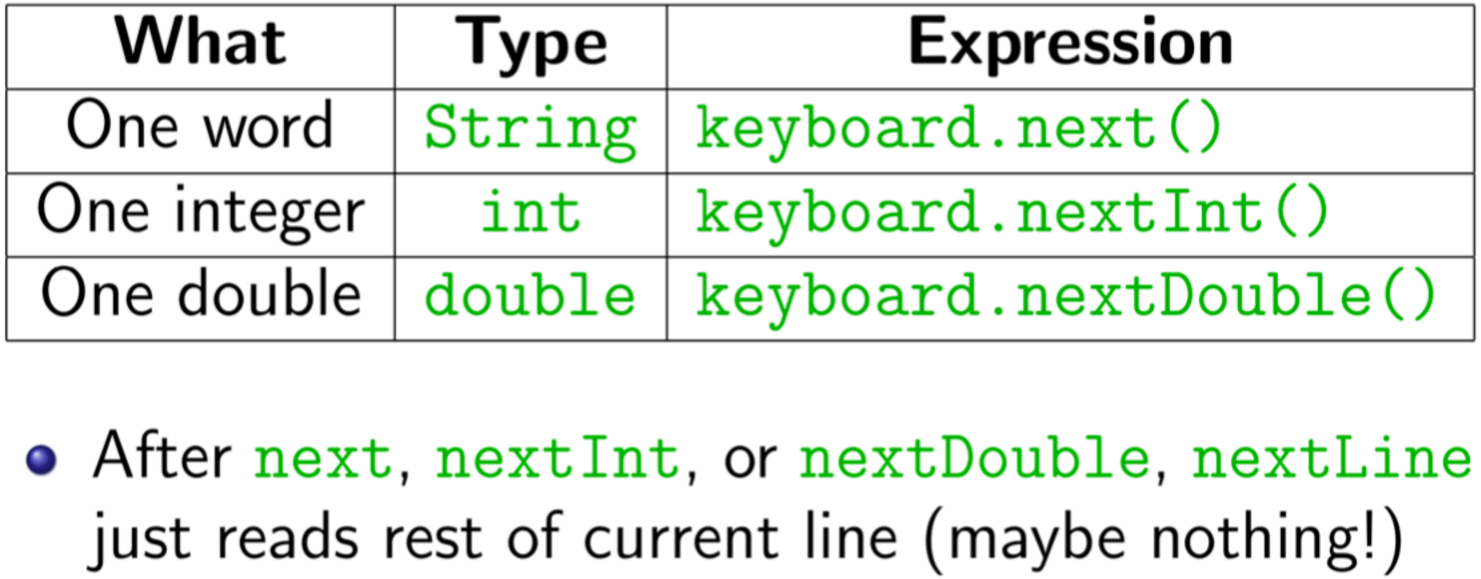
```
import java.util.Scanner;
```



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



```
String line = keyboard.nextLine();
```



What	Type	Expression
One word	`String`	`keyboard.next()`
One integer	`int`	`keyboard.nextInt()`
One double	`double`	`keyboard.nextDouble()`

- After `next`, `nextInt`, or `nextDouble`, `nextLine` just reads rest of current line (maybe nothing!)

demo3

read:

2020
hello
world

Lab 3 Q1

1.Write a program that reads two floating point numbers and print their sum, difference, and product.

eg: input : 0.1 0.2

“0.1 + 0.2 = 0.3”

“0.1 - 0.2 = -0.1”

“0.1 * 0.2 = 0.02”

What is type Casting?

Casting

java can convert types for you automatically

widening conversion（ automatically）converts a number to a wider type

byte -> short -> char -> int -> long -> float -> double

Narrowing Casting (manually) - converting a larger type to a smaller size type

double -> float -> long -> int -> char -> short -> byte

demo4

Math Class

Math.abs(x): Returns the absolute value of x

Math.PI

Math.pow(x, y): Returns the value of x to the power of y

Math.floor(x): Returns the value of x rounded down to its nearest integer

Math.max(x,y): Returns the number with the highest value

demo

Lab 3 Q2

2.Write a program that reads the radius of a sphere and prints its volume and surface area. Use the following formulas, where r represents the radius:

(a) Volume $= \frac{4}{3}\pi r^3$

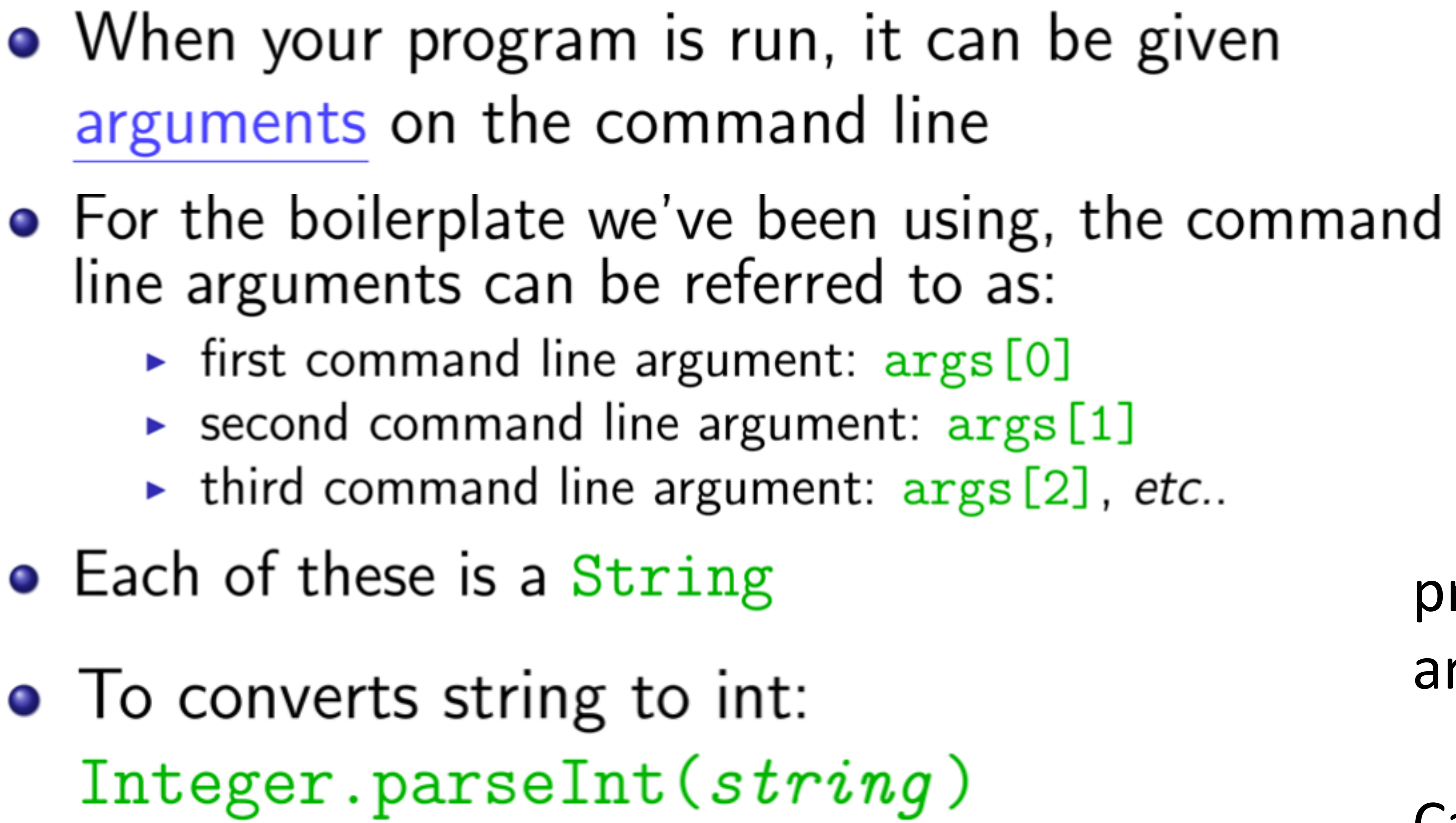
(b) Surface Area $= 4\pi r^2$

eg: input : 2

“volume : 33.51”

“surface area: 50.27”

handling command line inputs



- When your program is run, it can be given arguments on the command line
- For the boilerplate we've been using, the command line arguments can be referred to as:
    - first command line argument: `args[0]`
    - second command line argument: `args[1]`
    - third command line argument: `args[2]`, *etc.*.
- Each of these is a `String`
- To converts string to int: `Integer.parseInt(`*`string`*`)`

demo5

print “hello” + args[0] where args are names

Calculate args[0]+1

if /else

- Form:

  $\texttt{if (}\mathit{expr}\texttt{)}\ \mathit{Statement}_1\ \texttt{else}\ \mathit{Statement}_2$

- Executes $\mathit{Statement}_1$ if the expr is $\texttt{true}$, else executes $\texttt{Statement}_2$

demo6

- Java also has an if-else expression:

  $\mathit{expr}_1\ \texttt{?}\ \mathit{expr}_2\ \texttt{:}\ \mathit{expr}_3$

  - If expr_1 is $\texttt{true}$ value is expr_2
  - If expr_1 is $\texttt{false}$ value is expr_3

Print hello when x is greater than 0 else Print hi

For compound statements:

- Form: $\{\ \mathit{Statement}_1;\ \cdots\ \mathit{Statement}_n;\ \}$
- Don't follow the brace with semicolon

Lab 3 Q3

Write a program that calculates the total wages based on the number of hours worked.

The wages are calculated at a rate of 8.25 per hour for hours less than 40 and at the rate of 1.5 the standard rate for any hours greater than 40.

Number of hours is a command line argument to the program.

if t<40 wage = t * 8.25

if t>40 wage = 40*8.25 + (t-40) *8.25*1.5

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Thank you