CCC JUNIOR

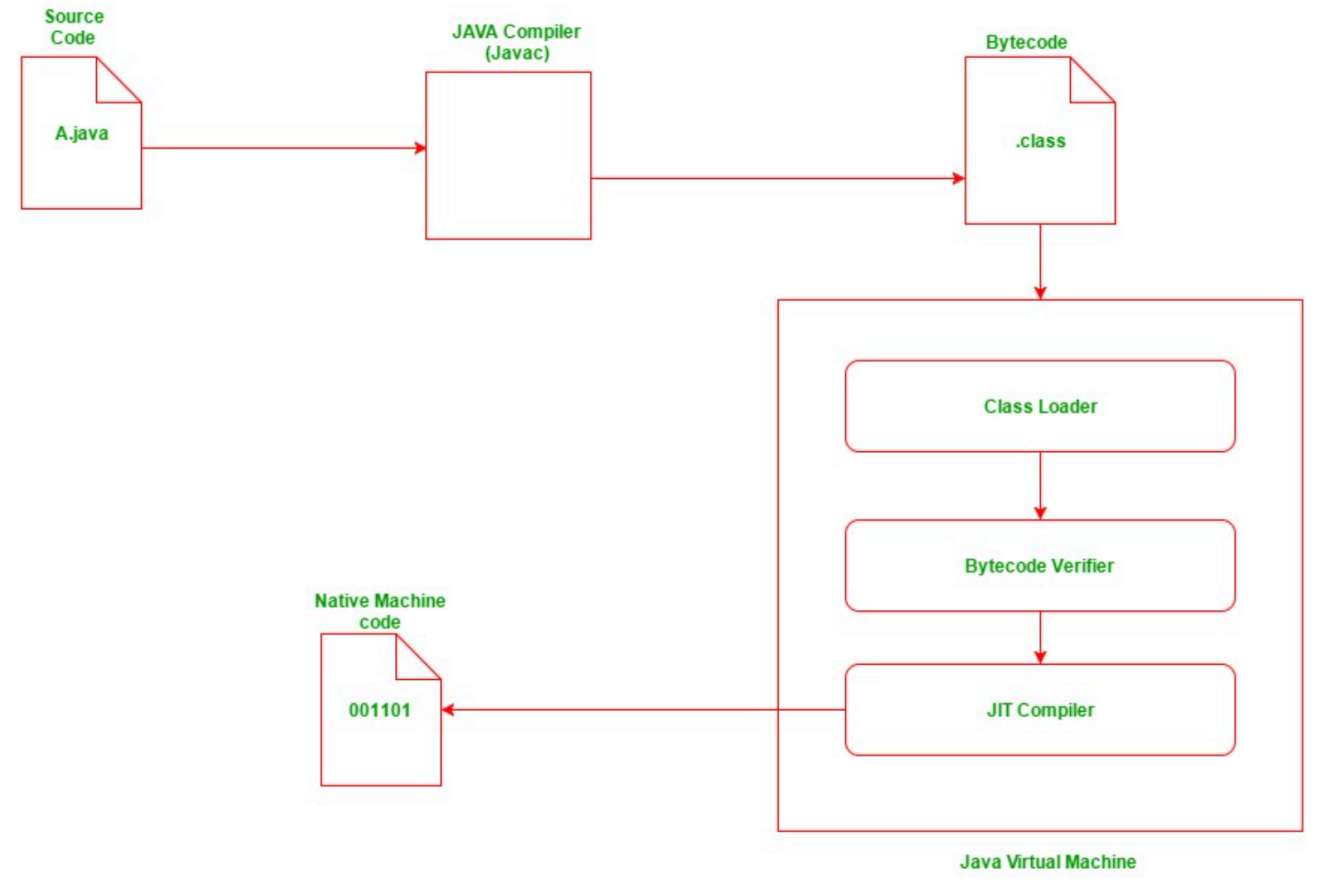
Java Introduction/If Else

今日课程预览

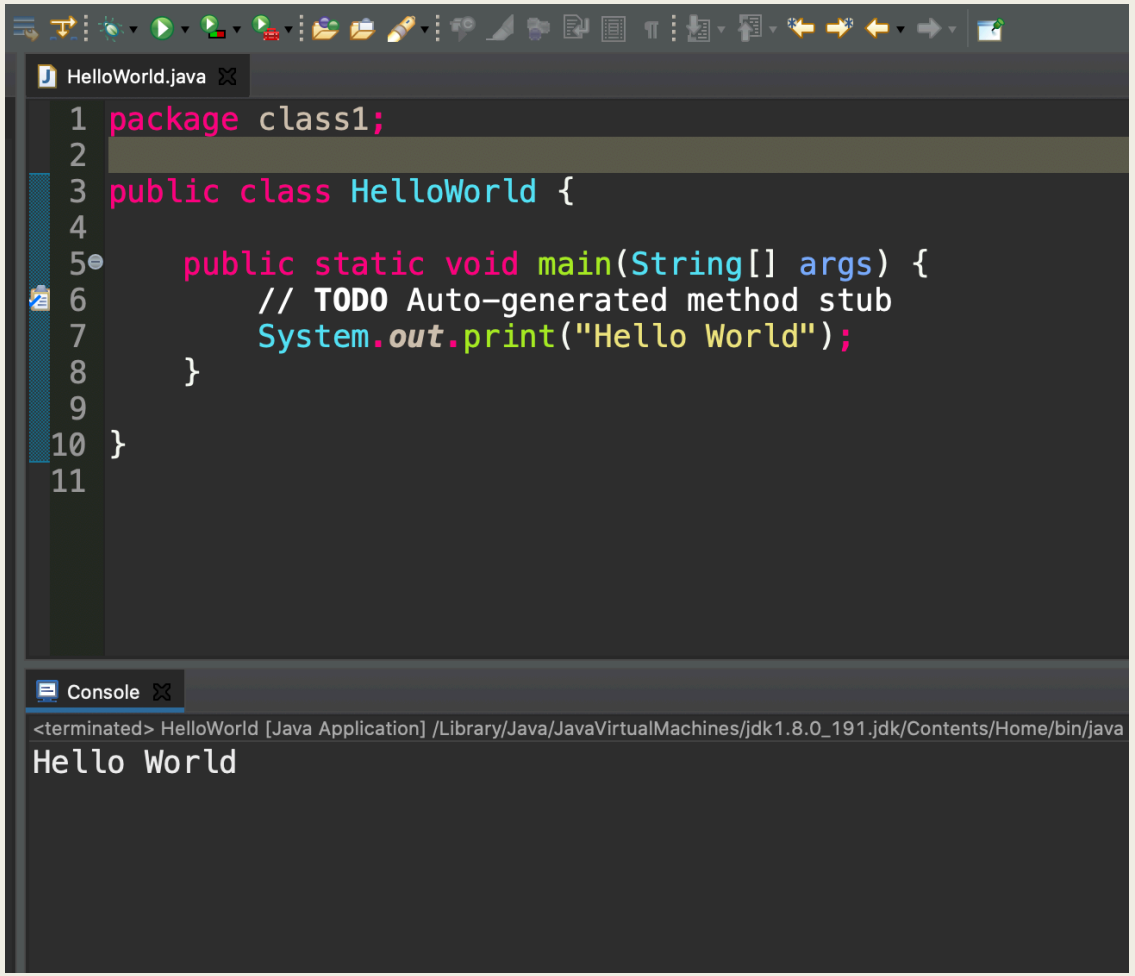
- JDK/JRE
- Runtime/Compile time
- Java Syntax
- Run Your Code in Main Method
- Print and Escape letter
- Operator and Comparator
- Method and Scope
- Math API/String API
- Branching by If and Else

JDK(Java Development Kit)

- The JDK includes a private JVM and a few other resources to finish the development of a Java application. It includes the Java Runtime Environment (JRE), an interpreter/loader (Java), a compiler (javac), an archiver (jar), a documentation generator (Javadoc) and other tools needed in Java development.



IDE(Integrated development environment)



- An integrated development environment (IDE) is a software application that provides comprehensive facilities to computer programmers for software development.
- An IDE normally consists of at least a source code editor, build automation tools and a debugger.

Run time/Compiling time

- Runtime and compile time are **programming terms** that refer to different stages of software program development.
- **Compile-time** is the instance where the code you entered is converted to executable.
- **Run-time** is the instance where the executable is running.
- The terms "runtime" and "compile time" are often used by programmers to refer to different types of errors too.

Java Syntax

- **Case Sensitivity** – Java is case sensitive, which means identifier **Hello** and **hello** would have different meaning in Java.
- Every sentence must be closed by “;”
- Every “{” needs to be closed by “}” properly
- Coding Style
  - *Always keep alignment between a pair of “{}”*
  - *Always add some comments to the code, with // or /**/*
  - *Naming convention*

main method

- Any code inside the main() method will be executed.
- Every Java program has a class name which must match the filename, and that every program must contain the main() method.

*HelloWorld.java

```java
package class1;

public class HelloWorld {

    public static void main(String[] args) {
        System.out.print("Hello World");
    }

}
```

How do you print?

- System.out.print() / System.out.println()
- Escape character
  - ***Newline*** *is replaced with* ***\n***
  - ***Tab*** *is replaced with* ***\t***
  - ***Double quote*** *is replaced with* ***\”***
  - ***Single quote*** *is replaced with* ***\’***
  - ***Backslash*** *is replaced with* ******

How do you talk with code?

- Scanner from keyboard
- import java.util.Scanner
- Scanner sc = new Scanner(System.in);
- You can scan an integer, a String or a line
- You need to consider scanner may scanner everything, even unintended keys.

Java Comment

- Single-line comments start with two forward slashes (//).

```
// This is a comment
System.out.print("Hello World");
```

- Multi-line comments start with /* and ends with */. Any text between /* and */ will be ignored by Java.

```
/* The code below will print the words Hello World
to the screen, and it is amazing */

System.out.print("Hello World");
```

Basic Data Type

- int – integers, positive, negative
- float - floating point numbers, with decimals
- double – floating point numbers, with decimals
- char - single characters
- String – wrapped by quotation
- boolean – true/false

Basic Operators

- =
- +
- -
- *
- /
- %
- ++/- -
- (+ in string means concatenate)

Data Type Casting

- **Widening Casting** (automatically) - converting a smaller type to a larger type size
  char -> int -> float -> double
- **Narrowing Casting** (manually) - converting a larger type to a smaller size type
  double -> float -> int -> char
- **ASCII Code**
- **String to Integer**
  - *Integer.parseInt("15");*

Dec	Hx	Oct	Char		Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html	Chr
0	0	000	NUL	(null)	32	20	040		Space	64	40	100	@	@	96	60	140	`	`
1	1	001	SOH	(start of heading)	33	21	041	!	!	65	41	101	A	A	97	61	141	a	a
2	2	002	STX	(start of text)	34	22	042	"	"	66	42	102	B	B	98	62	142	b	b
3	3	003	ETX	(end of text)	35	23	043	#	#	67	43	103	C	C	99	63	143	c	c
4	4	004	EOT	(end of transmission)	36	24	044	$	$	68	44	104	D	D	100	64	144	d	d
5	5	005	ENQ	(enquiry)	37	25	045	%	%	69	45	105	E	E	101	65	145	e	e
6	6	006	ACK	(acknowledge)	38	26	046	&	&	70	46	106	F	F	102	66	146	f	f
7	7	007	BEL	(bell)	39	27	047	'	'	71	47	107	G	G	103	67	147	g	g
8	8	010	BS	(backspace)	40	28	050	(	(	72	48	110	H	H	104	68	150	h	h
9	9	011	TAB	(horizontal tab)	41	29	051	)	)	73	49	111	I	I	105	69	151	i	i
10	A	012	LF	(NL line feed, new line)	42	2A	052	*	*	74	4A	112	J	J	106	6A	152	j	j
11	B	013	VT	(vertical tab)	43	2B	053	+	+	75	4B	113	K	K	107	6B	153	k	k
12	C	014	FF	(NP form feed, new page)	44	2C	054	,	,	76	4C	114	L	L	108	6C	154	l	l
13	D	015	CR	(carriage return)	45	2D	055	-	-	77	4D	115	M	M	109	6D	155	m	m
14	E	016	SO	(shift out)	46	2E	056	.	.	78	4E	116	N	N	110	6E	156	n	n
15	F	017	SI	(shift in)	47	2F	057	/	/	79	4F	117	O	O	111	6F	157	o	o
16	10	020	DLE	(data link escape)	48	30	060	0	0	80	50	120	P	P	112	70	160	p	p
17	11	021	DC1	(device control 1)	49	31	061	1	1	81	51	121	Q	Q	113	71	161	q	q
18	12	022	DC2	(device control 2)	50	32	062	2	2	82	52	122	R	R	114	72	162	r	r
19	13	023	DC3	(device control 3)	51	33	063	3	3	83	53	123	S	S	115	73	163	s	s
20	14	024	DC4	(device control 4)	52	34	064	4	4	84	54	124	T	T	116	74	164	t	t
21	15	025	NAK	(negative acknowledge)	53	35	065	5	5	85	55	125	U	U	117	75	165	u	u
22	16	026	SYN	(synchronous idle)	54	36	066	6	6	86	56	126	V	V	118	76	166	v	v
23	17	027	ETB	(end of trans. block)	55	37	067	7	7	87	57	127	W	W	119	77	167	w	w
24	18	030	CAN	(cancel)	56	38	070	8	8	88	58	130	X	X	120	78	170	x	x
25	19	031	EM	(end of medium)	57	39	071	9	9	89	59	131	Y	Y	121	79	171	y	y
26	1A	032	SUB	(substitute)	58	3A	072	:	:	90	5A	132	Z	Z	122	7A	172	z	z
27	1B	033	ESC	(escape)	59	3B	073	;	;	91	5B	133	[	[	123	7B	173	{	{
28	1C	034	FS	(file separator)	60	3C	074	<	<	92	5C	134	\	\	124	7C	174			|
29	1D	035	GS	(group separator)	61	3D	075	=	=	93	5D	135	]	]	125	7D	175	}	}
30	1E	036	RS	(record separator)	62	3E	076	>	>	94	5E	136	^	^	126	7E	176	~	~
31	1F	037	US	(unit separator)	63	3F	077	?	?	95	5F	137	_	_	127	7F	177	&#127;	DEL

- What is the data type of the following values?
  - *10/“10”*
  - *true/“true”*
  - *‘E’/”E”*

- What will be the result printed?
  - *System.out.println(“1” + “2”);*
  - *System.out.println(1+2);*
  - *System.out.println(1.3+ 2);*
  - *System.out.println(2 * 5.0);*
  - *System.out.println(10/ 5.0);*
  - *System.out.println(10/ 5);*
  - *System.out.println(10/ 3);*

Comparator and Logic

- ==
- >
- <
- >=
- <=
- !=
- && -- and
- || -- or

Method

- A **method** is a block of code which only runs when it is called.
- You can pass data, known as parameters, into a method.
- Methods are used to perform certain actions, and they are also known as **functions**.
- Method name – usually starts with lowercase
- Parameters
- Return type

Math API

- import java.lang.Math
- Math.max()
- Math.min()
- Math.sqrt()
- Math.random() -> generate a number in [0, 1)
  - *(int)(Math.random() * (max – min + 1)) + min*
- Math.abs()
- Math.floor()
- Math.ceil()

String API

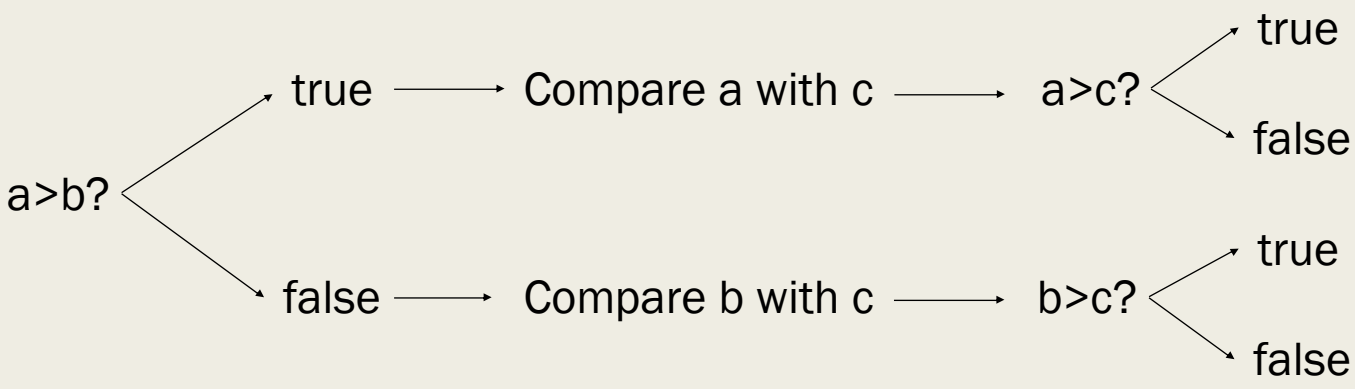
- charAt(int index)
- equals(String s)
- startsWith(String prefix)
- endsWith(String postfix)
- length()
- split(String regex)
- substring(int beginningIndex)
- substring(int beginningIndex, int endingIndex)

Branching - if/else if/else

- Start with “if”
- Can have at most one ”else”
- Can have any number of “else if” in between

Find the Largest Among 3 numbers

Fetch 3 integer values from keyboard, output the largest value among those 3 numbers



2012 CCC J1

https://cemc.math.uwaterloo.ca/contests/computing/2012/stage1/juniorEn.pdf

Problem Description

Many communities now have “radar” signs that tell drivers what their speed is, in the hope that they will slow down. You will output a message for a “radar” sign. The message will display information to a driver based on his/her speed according to the following table:

km/h over the limit	Fine
1 to 20	$100
21 to 30	$270
31 or above	$500

Input Specification

The user will be prompted to enter two integers. First, the user will be prompted to enter the speed limit. Second, the user will be prompted to enter the recorded speed of the car. Output Specification If the driver is not speeding, the output should be: Congratulations, you are within the speed limit! If the driver is speeding, the output should be: You are speeding and your fine is $F. where F is the amount of the fine as described in the table above.

Sample Input and Output

Sample Session 1

Enter the speed limit: 40

Enter the recorded speed of the car: 39

Congratulations, you are within the speed limit!

Sample Session 2

Enter the speed limit: 100

Enter the recorded speed of the car: 131

You are speeding and your fine is $500.

Sample Session 3

Enter the speed limit: 100

Enter the recorded speed of the car: 120

You are speeding and your fine is $100.

2013 CCC J1

https://cemc.math.uwaterloo.ca/contests/computing/2013/stage1/juniorEn.pdf

Problem Description

You know a family with three children. Their ages form an arithmetic sequence: the difference in ages between the middle child and youngest child is the same as the difference in ages between the oldest child and the middle child. For example, their ages could be 5, 10 and 15, since both adjacent pairs have a difference of 5 years. Given the ages of the youngest and middle children, what is the age of the oldest child?

Input Specification

The input consists of two integers, each on a separate line. The first line is the age Y of the youngest child ($0 \leq Y \leq 50$). The second line is the age M of the middle child ($Y \leq M \leq 50$).

Output Specification

The output will be the age of the oldest child.

Sample Input and Output

Sample Input 1

12

15

Output for Sample Input 1

18

Sample Input 2

10

10

Output for Sample Input 2

10

2014 CCC J1

https://cemc.math.uwaterloo.ca/contests/computing/2014/stage%201/juniorEn.pdf

Problem Description

You have trouble remembering which type of triangle is which. You write a program to help. Your program reads in three angles (in degrees).

- If all three angles are 60, output Equilateral.
- If the three angles add up to 180 and exactly two of the angles are the same, output Isosceles.
- If the three angles add up to 180 and no two angles are the same, output Scalene.
- If the three angles do not add up to 180, output Error.

Input Specification

The input consists of three integers, each on a separate line. Each integer will be greater than 0 and less than 180.

Output Specification

Exactly one of Equilateral, Isosceles, Scalene or Error will be printed on one line.

Sample Input and Output

Sample Input 1
60 70 50

Output for Sample Input 1

Scalene

Sample Input 2

60 75 55

Output for Sample Input 2

Error