Unit 02_005 — Comments

1. In Java, what symbol is used to indicate the rest of a line is a comment?

2. Can a program have too many comments? Briefly explain your answer.

Unit 02_010 Data Representation

3. What is a bit? What values can a bit store?

4. If a system has `n` bits, what is the formula to tell you how many different patterns can be created?

5.   • If you have 1 bit, how many patterns are possible?

     • If you have 4 bits, how many patterns are possible?

     • If you have 8 bits, how many patterns are possible?

     • If you have 10 bits, *approximately* how many patterns are possible?

     • If you have 20 bits, *approximately* how many patterns are possible?

     • If you have 30 bits, *approximately* how many patterns are possible?

6. What is a kilobit?(approximately) What is it in terms of a power of 2?
   Hint: The answer I am looking for is about a thousand or 2^{10}

7. What is a megabit? (approximately) What is it in terms of a power of 2?

8. What is a gigabit? (approximately) What is it in terms of a power of 2?

9. What is a terabit? (approximately) What is it in terms of a power of 2? This was not in the video. Guess. Then look it up on the internet to confirm whether you were correct.

Unit 02_020 Integer Types

10. What is a byte?

11. What is the name given to the base 2 number system?

12. What is the name given to the base 10 number system?

13. What is the name given to the base 16 number system?

Unit 02_030 Java Integer types

14. What is the largest integer that can be stored in a Java `byte` ?

15. What is the name of the Java data type that can hold integers up to 32,767?

16. 32 bits can store over 4 billion values. A Java `int` uses 32 bits, but it only stores numbers up to a little over 2 billion? Why can't an int store up to 4 billion values?

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17. What Java data type uses 64 bits to store integers?

Unit 02_040 Java Identifiers

18. Create a java variable that holds the number of miles between two locations.

19. How should the following statement be read? `i = i + 1`

20. For each of the following, write "valid" next to it if it is a valid Java identifier. (hint: if in doubt, try it in IntelliJ) If it is invalid, say why it is invalid. Write a comment if you think it might be a style problem.

    - `count`

    - `total distance`

    - `28`

    - `total.distance`

    - `total_distance`

    - `total+distance`

    - `a`

Unit 02_050 Real Numbers

21. What is the main data type used for real numbers in Java?

22. Java has a second data type used for real numbers, but it is not used as often. What is the lesser used data type for real numbers?

23. How many significant digits are represented in a `double` in Java?

24. How many significant digits are represented in a `float` in Java?

25. In terms of powers of 10, what is the largest possible exponent for a `double`?
    I just realized I skipped this in the video. The answer is 10^{308}

26. In terms of powers of 10, what is the largest possible exponent for a `float`?
    I just realized I skipped this in the video. The answer is 10^{38}

Unit 02_060 Arithmetic Operators

27. What symbol is used for each operation

  - addition

  - subtraction

  - multiplication

  - division

  - modulo

28. What would be printed by the following block of code?

```
int a = 17;
int b = 5;
int c = a / b;
int d = b / a;
int e = a % b;
int f = b % a;
System.out.println("c is " + c );
System.out.println("d is " + d );
System.out.println("e is " + e );
System.out.println("f is " + f );
```

c is _____
d is _____
e is _____
f is _____

29. What is the value of each of the following expressions?

  - 2 + 3 * 4
  - 2 * 3 + 4
  - 10 / 3
  - 3 / 10
  - 3 % 10
  - 10 % 3

30. Do you have any other questions?