Data types

1. **In what format is Integer data stored in memory unit?**

   base-2 format

2. **In what format is real number data stored in memory unit?**
   IEEE format

3. **Which data types in Java are used to handle Integer data?**
   byte, short, int and long

4. **In what format is still picture data stored in memory unit?**
   .jpeg format and .gif format

5. **What are the different types of data in real world?**
   Character type data, integer type data, real number type data, yes/no type data, still picture type data, audio and video type data

6. **In what format is video data stored in memory unit**
   .mp4 format and .avi format

7. **What is the real number data by default treated in Java?**
   Double

8. **What is the range of data that can be stored in long data type?**
   -9223372036854775808L to +9223372036854775807L

9. **How many bytes are allocated for short data type in Java?**
   2 Bytes

10. **Does Java follow ASCII or UNICODE ? Why?**
    UNICODE. Because UNICODE would be having binary representations for all the symbols of all the languages which are currently used across the globe)

11. How many bytes are allocated for long data type in Java?

8 bytes

12. How many bytes are allocated for float data type in Java?

4 bytes

13. What is the range of data that can be stored in byte data type?

-128 to +127

14. In what format is audio data stored in memory unit?

.mp3 format

15. What is the range of data that can be stored in short data type?

-32768 to +32767

16. How many bytes are allocated for char data type in Java? Why?

2 bytes, because java follows UNICODE format

17. Is zero a positive number or negative number in programming? Why?

Zero is a positive number, because the most significant bit in the positive number is zero

18. Who initiates the process of executing a program?

OS

19. Why does Java provide primitive data types in spite of the fact that it makes it only 99% OOP?

Because creation of variables using primitive data types is faster than creating an object using wrapper classes)

20. What is the range of double?

-1.7e-308 to +1.7e+308

21. Why does Java provide four data types to manage Integer type data?

Because in real world integer data exists in varying magnitudes.

22. Why does Java provide two data types to manage real number type data?

For less precision and higher precision i.e. double type provides more accuracy than float type)

23. Why should data be stored in form of 0s and 1s in the memory?

Because every memory device can store only 0's and 1's

24. How is audio type data handled in Java?

Using in built classes

25. How is video type data handled in Java?

Using in built classes

26. How is still picture type data handled in Java?

Using in built classes

27. How many bytes are allocated for boolean data type in Java?

It is OS dependent or JVM dependent.

28. What is the range of float?

-3.4e-038 to +3.4e+038

29. What are the different data types in Java?

byte, short, int, long, float, double, boolean, char

30. How is data stored in the memory unit?

In the binary form

31. Which data types in Java are used to handle real number data?

float and double

32. In what format is character data stored in memory unit?

UTF-16 format or UTF-32 format

33. In what format is yes/no data stored in memory unit?

It is JVM dependent

34. Why did UNICODE come into existence?

Because ASCII does not have binary representation for all the symbols of all the languages which are currently used across the globe.

35. What is the range of data that can be stored in int data type?

-2147483648 to 2147483647

36. How can you convert double data type to float data type in Java?

i) By explicit typecasting

Eg. float a = (float) 24.17;

ii) By adding suffix 'f'

Eg. float a = 24.17f;

37. How many bytes are allocated for byte data type in Java?

1 byte

38. How many bytes are allocated for double data type in Java?

8 bytes

39. How many bytes are allocated for int data type in Java?

4 bytes

40. Which special characters may be used as the first character of an identifier?

_ and $

41. Which characters may be used as the second character of an identifier, but not as the first character of an identifier?

Digits cannot be used as the first character.
Eg. t6emp=25; and temp6=35; are valid whereas,

6temp=25; is invalid.

42. How many bit format is ASCII exactly?
7 bit format

43. Why is ASCII format forcefully stored as 8-bit format?
Because minimum memory that can be allocated is 1 Byte i.e. 8bits

44. What is UTF?
UTF stands for Universal Translational Format

45. What is UTF-8? When is it used normally?
UTF-8 is used whenever binary representations for only English and its associated symbols are required in the project.

46. What is UTF-16? When is it used normally?
UTF-16 is used whenever the binary representations for all the symbols of all the languages which are currently used across the world are required in the project.

47. What is UTF-32? When is it used normally?
UTF-32 is used whenever along with current languages symbols, even ancient languages symbols' binary representations are required in the project.

48. What is meant by rounding towards zero in integer division?
Truncation, i.e. fractional portion is truncated and only the integer portion is retained.
Eg. (refer class notes)

49. What is meant by truncation?
Truncation is the process of eliminating the fractional part and retaining only the integer portion. It is also called as rounding towards zero.

50. Are true and false keywords?
true and false are reserved words.

51. What is numeric promotion?

When data of a smaller magnitude is placed within a memory location of a larger magnitude, it is called as numeric promotion. Implicit typecasting is also called as numeric promotion.

52. What is the difference between the prefix and postfix forms of the ++ operator?

Pre increment: increment first and then assign, post increment: first assign and then increment (Refer class notes for more examples)

53. What are the rules associated with the usage of underscore in a literal?

With respect to literal creation only one special character is permitted which is '_'(underscore). It can only be used in between the literal any number of times and nowhere else i.e.

1) Underscore cannot be used before or after literal.

Eg.

```
int temp=9_9;//valid
int temp=9____9;//valid
int temp=_99;//invalid
int temp=99_;//invalid
```

2) It cannot be used before prefix or in between the prefix or soon after the prefix

Eg.

```
int temp=_0x45; //invalid
int temp=0_x45; //invalid
int temp=0x_45; //invalid
int temp=0x4_5; //valid
```

3) It cannot be used before or after suffix

Eg.

```
float temp=45.5f_;//invalid
float temp=45.5_f; //invalid
float temp=4_5.5f; //valid
```

4) It cannot be used before or after decimal points

Eg.

```
float temp=45_.5f;//invalid
float temp=45._5f;//invalid
float temp=4_5.5f;//valid
```

54. What is meant by "Java is a strongly typed language"?

Every variable in java must have an associated data type and also a value which is compatible with the data type.

55. Give the implicit upcasting chart or numeric promotion chart?

(Refer class notes)

56. Which Java operator is right to left associative?

Assignment operator (=)

57. Can a double value be cast to a byte?

Yes.

58. Express double a = 123.45 in scientific notation?

double a = 1.2345E+2

59. What is the difference between char literal and string literal?

Character literal is data which is enclosed within single quotes whereas String literal is data which is enclosed within double quotes.

60. Can we use underscore in a literal?

Yes.

61. What is the difference between declaring a variable and defining a variable?

```
int a;      // declaring,
int a=100;  // defining
```

62. Can we create binary literals in Java?

Yes. Using a prefix 0b

63. How do we make a project coded in Java a pure OOP project?
Using wrapper classes.

64. What is the role of wrapper classes in Java?
Using wrapper classes, creation of primitive variables can be avoided and hence a pure object oriented project can be developed.

65. What happens if a larger magnitude data is assigned to a value of a data type which cannot handle it?
Overflow or loss of precision occurs.

66. Should type casting be performed explicitly?
Depends upon whether implicit or explicit typecasting is performed.

67. Does type casting reduce the precision of the data?
Depends upon whether implicit or explicit typecasting is performed. Implicit typecasting does not reduce precision whereas explicit typecasting reduces precision.

68. Should numeric promotion be performed explicitly?
No. Numeric promotion also known as implicit casting or java automatic conversions where conversion of a smaller numeric type to a larger numeric type takes place.

69. Does numeric promotion reduce the precision of the data?
No

70. What is the role of formats in data types?
It is used to convert real world data in its original form into 0s and 1s so that it can be stored in the memory unit.

71. What is a variable?
It is a reserved memory location into which a value can be stored

72. What are the types of variables available in Java?
Local variables, instance variables, reference variables and static variables.

73. How is a negative number stored in Byte data type?
Using 2's compliment base-2 format.

74. How is a negative number stored in short data type?
Using 2's compliment base-2 format.

75. How is a negative number stored in int data type?
Using 2's compliment base-2 format.

76. How is a negative number stored in long data type?
Using 2's compliment base-2 format.

77. What is the range of char?
0 to 65535

78. What is a literal?
Literal is a fixed value which is assigned to a variable.

79. What does a prefix 0 indicate in a literal?
It indicates that the number is an Octal.

80. What does a prefix 0x indicate in a literal?
It indicates that the number is Hexadecimal.

81. How do we display a \ in Java?
s.o.p('\\');

82. How do we display " in Java?
s.o.p('\"');

83. How do we display ' in Java?
s.o.p('\' ');

84. Do we have unsigned integer format in Java?
Not up to java 1.7. However, from java 1.8 it is supported.

85. Can we use the float data type to hold the precise values such as currency?

No. Rather, inbuilt class Currency is used.

86. Can we use the double data type to hold the precise values such as currency?

No. Rather, inbuilt class Currency is used.

87. What is the default value of long?

0L

88. What is the default value of double?

0.0

89. What is the default value of char?

'\u0000' i.e. blank character.

90. How is a binary literal created in Java?

Using the prefix 0b

91. Identify valid and invalid literals?

```
long creditCardNumber = 1234_5678_9012_3456L;
long socialSecurityNumber = 999_99_9999L;
float pi = 3.14_15F;
long hexBytes = 0xFF_EC_DE_5E;
long hexWords = 0xCAFE_BABE;
long maxLong = 0x7fff_ffff_ffff_ffffL;
byte nybbles = 0b0010_0101;
long bytes = 0b11010010_01101001_10010100_10010010;
float pi1 = 3_.1415F;
float pi2 = 3._1415F;
long socialSecurityNumber1 = 999_99_9999_L;
int x1 = 5_2;
int x2 = 52_;
int x3 = 5_____2;
int x4 = 0_x52;
int x5 = 0x_52;
int x6 = 0x5_2;
int x7 = 0x52_;
```