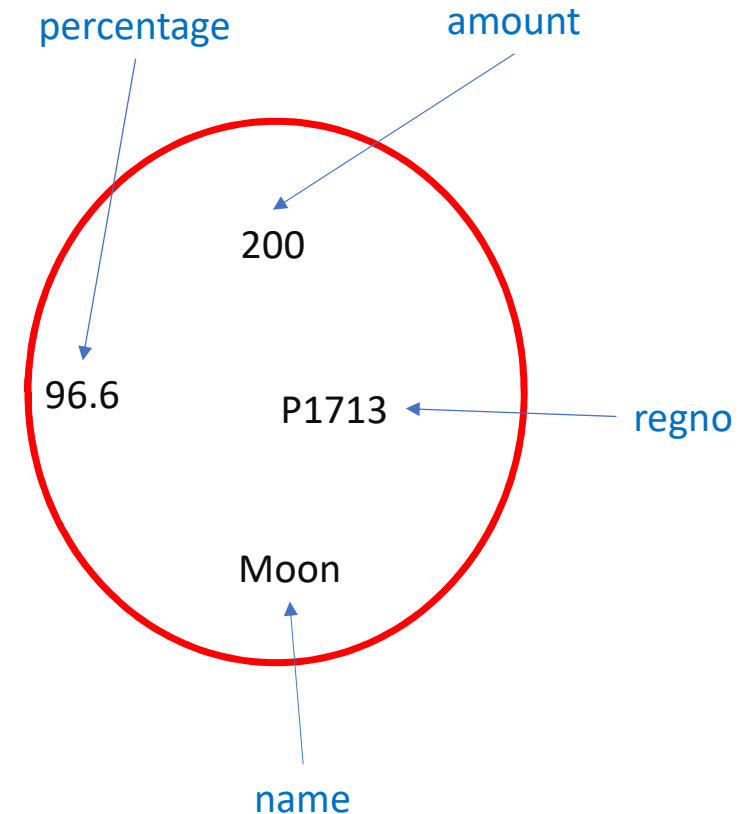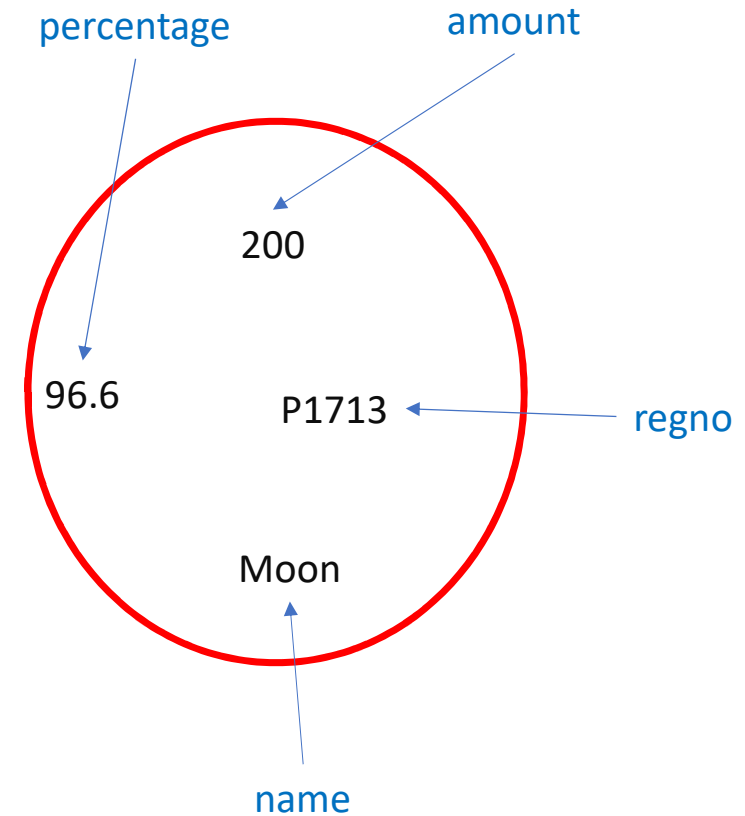# Basic Datatypes

- Datatypes: int, String, float, short, byte, long, double, Boolean.

- Datatypes used to create a variables.

- Variables are reserved memory location to store values.

- When we create variables, we receive some space in memory.

percentage

amount

200

96.6

P1713

regno

Moon

name

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Basic Datatypes

- Based on the datatype of variable, the operating system allocate memory and decides what can be stored in their memory.

- By assigning different values to variables, we can store different datatypes.

- 2 datatypes: Primitive, Reference/Object

percentage   amount

200

96.6   P1713   regno

Moon

name

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Basic Datatypes – Primitive Data Types

- Primitive datatypes are predefined by the language and named by a keywords.

- There are 8 primitive datatypes supported by java.

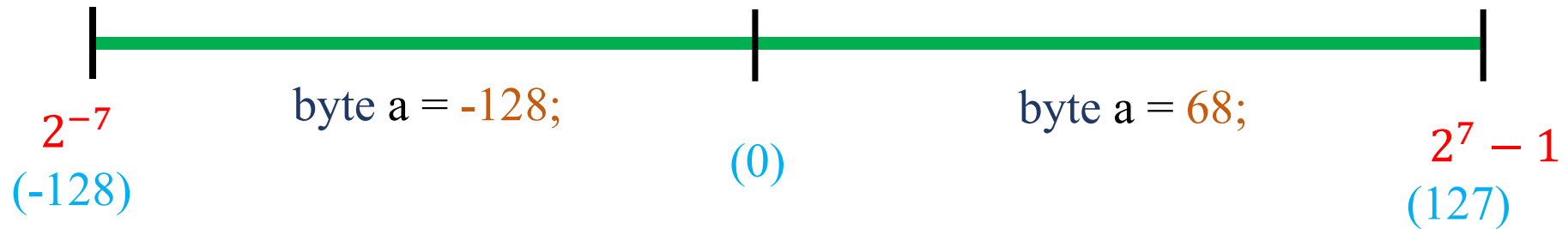1. byte
2. short
3. int
4. long

5. float
6. double
7. boolean
8. char

<u>Primitive Data Types</u> (byte)
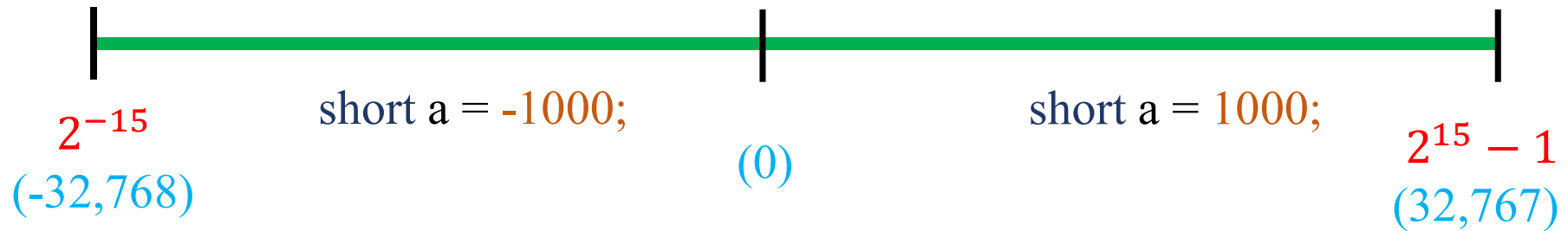
- 8 bit signed 2's complement integer.

2^{-7}
(-128)

byte a = -128;

(0)

byte a = 68;

$2^7 - 1$
(127)

- Used to save space in large array.

- 4 times smaller than int.

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Primitive Data Types (short)

- 16 bit signed 2's complement integer.

2^{-15}
short a = -1000;   (0)   short a = 1000; $2^{15} - 1$
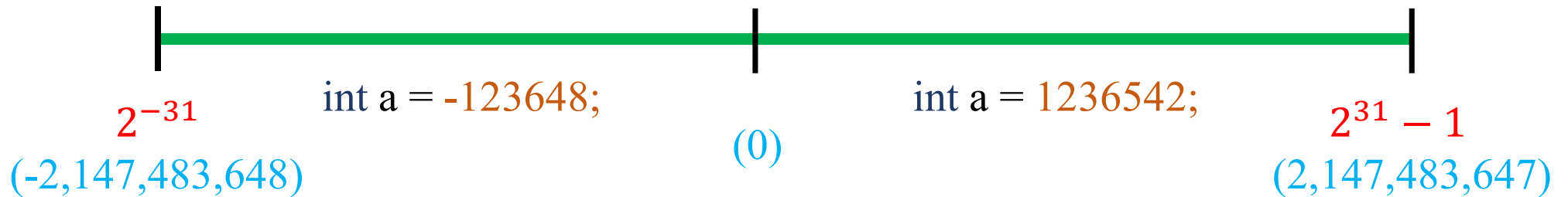(-32,768)   (32,767)

- Used to save space in large array.

- 2 times smaller than int.

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Primitive Data Types (int)

- 32 bit signed 2's complement integer.

$$2^{-31}$$
(-2,147,483,648)

int a = -123648;

(0)

int a = 1236542;

$$2^{31} - 1$$
(2,147,483,647)

- Default datatypes for integral values.

- There is a concern about memory.

Primitive Data Types (long)

- 64 bit signed 2's complement integer.

2^{-64} long a = -100L;   int a = 10486L; $2^{63} - 1$

-9,223,372,036,854,775,808 *to* 0L *to* -9,223,372,036,854,775,807

- This type is used when a wider range than int is need

L is maximum duration of 32

$10486L = 10486^{31}$

Primitive Data Types (float)

- single-precision 32-bit IEEE 754 floating point.

$$2^{-14} \qquad\qquad 0.0f \qquad \text{float } a = 234.5f; \qquad 2 - 2^{-63}.2^{127}$$

- Used to save memory in large arrays of floating point values.

- Never used for precise values such as currency.

Primitive Data Types (double)

- double-precision 32-bit IEEE 754 floating point.

$$2^{-149} \qquad\qquad 0.0d \qquad\qquad \text{double a} = 234.5; \qquad\qquad 2 - 2^{-63}.2^{127}$$

- generally used as the default data type for decimal values.

- Never used for precise values such as currency.

Primitive Data Types (boolean)

- It represents one bit of information.

- 2 possible values: true and false.

- This data type is used for simple flags that track true/false conditions.

- Default value: false.

asign a=10

asign b=20

a=b   //false

asign b=b-a

a=b //true

boolean a = true;
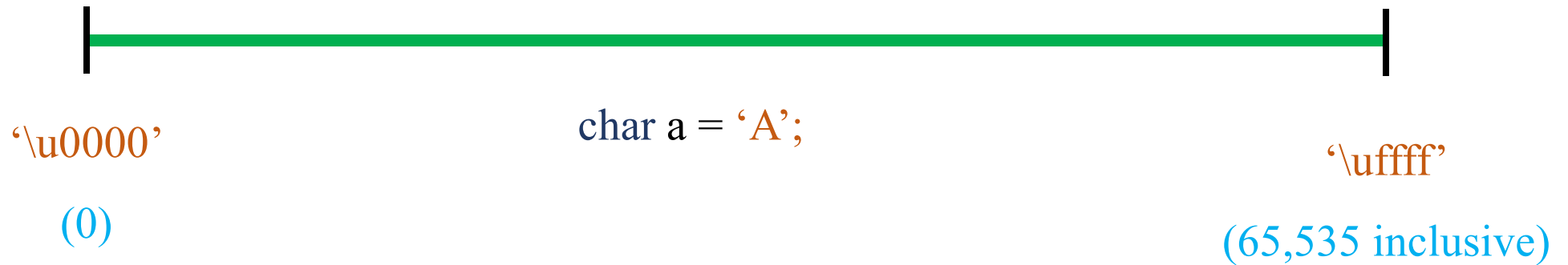
Primitive Data Types (char)

- 16 bit Unicode character.

char a = 'A';

'\u0000'

(0)

'\uffff'

(65,535 inclusive)

- Char data type is used to store any character.

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Basic Datatypes – Reference Data Types

- Reference variables are created using defined constructors of the classes.

- They are used to access objects.

- Class objects and various type of array variables come under reference datatype

- Default value is null.

```
Animal a=new Animal();

Animal a=new Animal(0,'asdf');
```

Basic Datatypes

- Few special escape sequences for String and char literals

Notation	Character represented
\n	Newline (0x0a)
\r	Carriage return (0x0d)
\f	Formfeed (0x0c)
\b	Backspace (0x08)
\s	Space (0x20)
\t	tab
\"	Double quote
\'	Single quote
\\	backslash
\ddd	Octal character (ddd)
\uxxxx	Hexadecimal UNICODE character (xxxx)

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