Data Types

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Data Types

Primitive/Inbuilt data types

- Integer types
- Floating point types
- Character
- Boolean

Reference/User-defined data types

- Arrays
- Class
- String

Primitive Data types

Integer types

- byte -> 8 bits → -2^7 to 2^7-1
- short -> 16 bits → -2^{15} to $2^{15}-1$
- int -> 32 bits → -2^{31} to $2^{31}-1$
- long -> 64 bits → $-2^{63}$to $2^{63}-1$

Floating point numbers

- float -> 32 bits → single precision
- double -> 64 bits → double precision

Character

- char -> 16 bits → 0 to 65536

Boolean

- boolean → true or false

(does not take a value of 0 or 1)

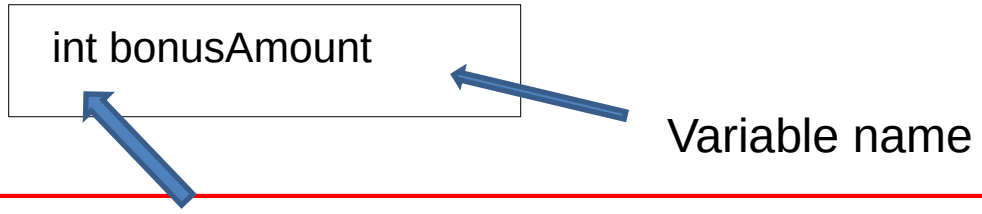
Variables

- A **variable** is a container that holds values that are used in a **Java** program. Every **variable** must be declared to use a data type.

- Can
  - start with $ or _ or alphabet
  - be of any max length
  - lower or upper case

  eg. $money, name, last_name
- Can't
  - Start with number
  - be keywords or special characters.

  eg. 5money, class→ is wrong



Literals

Integer Data types

Decimal	int x = 45;	
Octal	int y = 034;	- 28
Binary	int p = 0b1100;	- 12
Hexadecimal	int z = 0xABC;	- 2748

```
byte b = 100;
short s = 10000;
long x = 345L;
long y=23l;
```

Floating Point types

float	float a = 23.4f;
	float b = 56.4F;
double	double x = 45.9;
	double y = 45.9d;
	double z = 45.9D;

In java all floating point numbers are ***double*** by default

Literals

character

-unicode representation of characters (special characters)

\\	- backslash
\b	- backspace
\”	- double quotes
\’	- single quotes
\n	- newline
\t	-tab

eg. String s=“\”welcome to java\”” “welcome to java”

boolean

boolean b = true; (default is false)

Underscore in Numeric Literals

- Underscore helps to separate groups of digits in numeric literals
- For a number with many digits, use underscore to separate digits in groups of three(like a comma).
- Any number of underscore characters (_) can be added

eg.

```
long creditCardNumber = 1234_5678_9012_3456L;
long socialSecurityNumber = 999_99_9999L;
long hexNum = 0xFF_EC_DE_5E;
```

DON'T use underscore

- At the beginning or end of a number **int x=34_; int y=0x_88;**
- Adjacent to a decimal point in a floating point literal **float f=1_.2f;**
- Prior to an F or L suffix **long k = 356_L;**

Enum

- Is a data type with a set of predefined constants(directions, week)
- define an **enum** type by using the enum keyword.
- The names of an enum type's fields are in uppercase letters(constant)
- All enums implicitly extend java.lang.Enum

```
enum Days {
    MONDAY, TUESDAY,WEDNESDAY,THURSDAY,FRIDAY,SATURDAY ;
}
```

Enum

- The enum declaration defines a class - an enum type.
- The enum class body can include methods and other fields.
- The constructor for an enum type can be private or default access.

```
enum Vehicle{
    SKODA("Sedan",18000.90),
    SCORPIO("SUV",20000.90),
    NANO("MINI",1003.90);
    String features;double price;

    Vehicle(String f,double price){
         this.price = price;
         this.features = f;
     }
    }
```

Type Casting and Conversion

Automatic Conversion

Upcasting

- Two types are compatible
- Target type is greater than the source

eg. int y = 40;
long x = y;

Narrowing Conversion

Downcasting

- Two types are incompatible
- Target type is smaller than the source

eg. long y = 40;
int x ;
x = (int)y;

Summary

- Datatypes
  - Primitive
  - Reference
- Variables
- Literals
- Enum
- Typecasting

Thank You