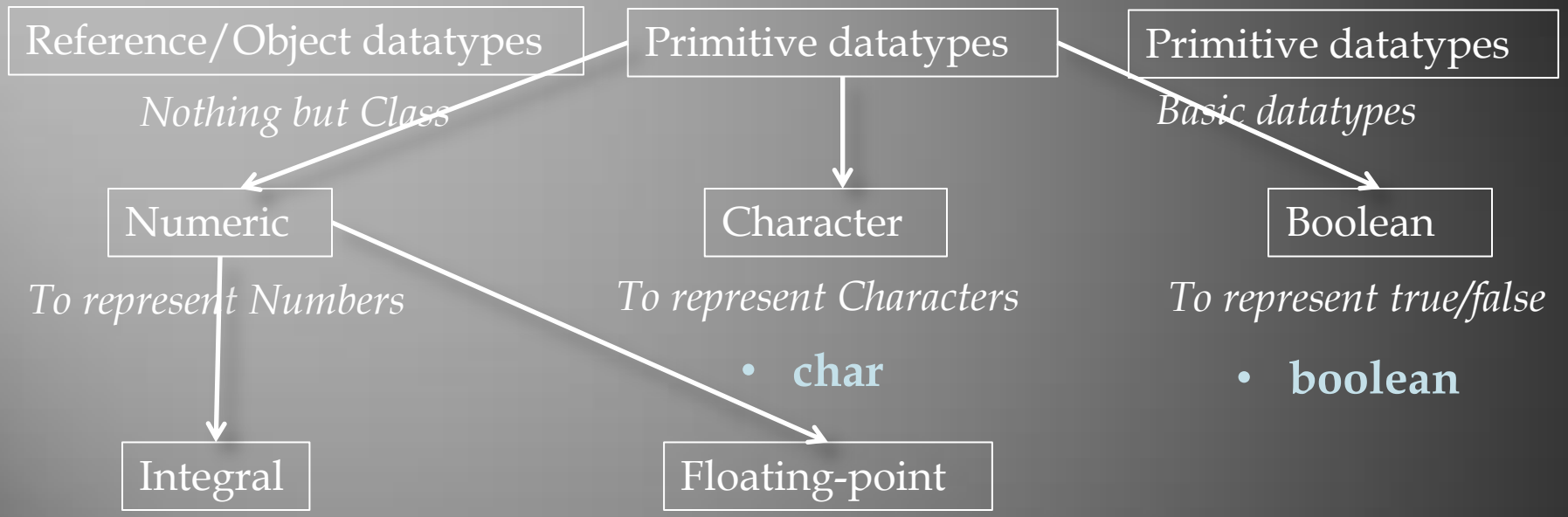
LANGUAGE FUNDAMENTALS

Ram Sharma

Datatype

It specifies the type of information to be stored in a variable or reference



String

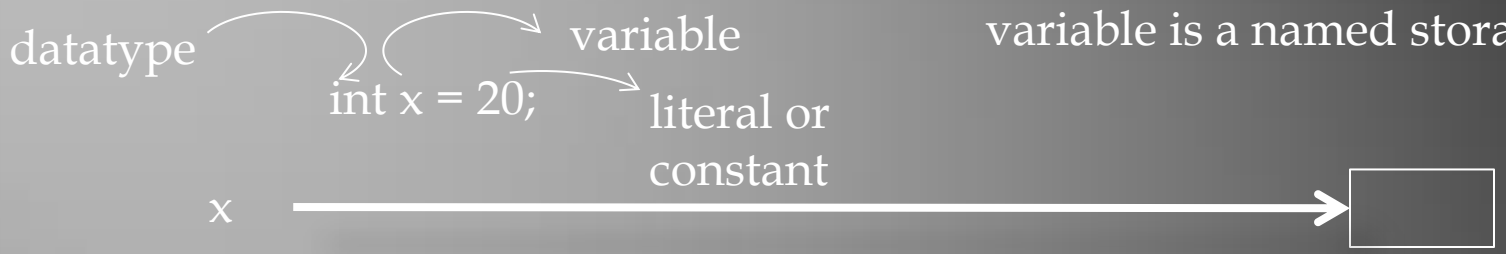
Any sequence of characters within " " (double quotes) is called as String.
It is reference datatype.

Datatype(Contd.)

Data type	Size (In bytes)	Range	Wrapper class	Default value
byte	1	(-2^7 to $2^7 -1$) (-128 to 127)	Byte	0
short	2	-32768 to 32767	Short	0
int	4	-2^{31} to $-2^{31} -1$	Integer	0
long	8	-2^{63} to $-2^{63} -1$	Long	0L
float	4	$-3.4e^{38}$ to $3.4e^{38}$	Float	0.0f
double	8	$-1.7e^{308}$ to $1.7e^{308}$	Double	0.0d
char	2	0 to 65535	Character	'\u0000' (space)
boolean	N/A	Only true and false	Boolean	false
String	depends	N/A	N/A	null

The default datatype of whole number is integer and decimal number is double.

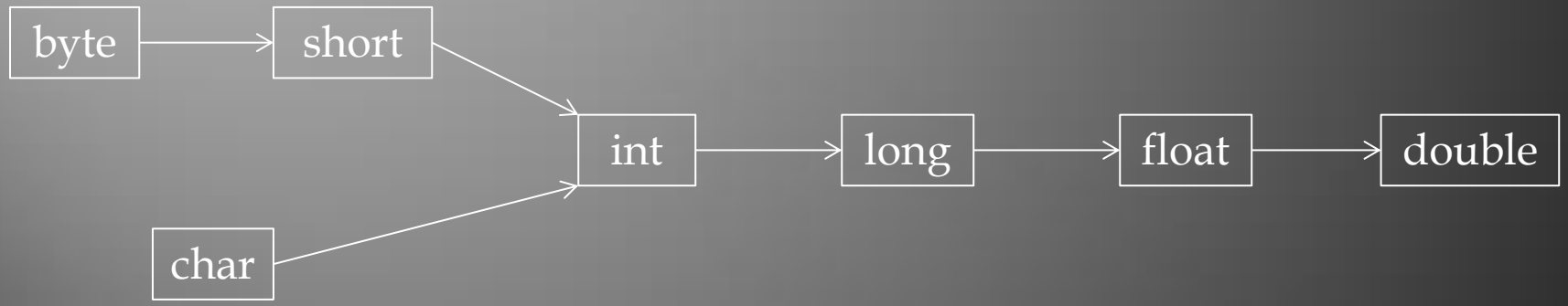
Variables and conversion



variable is a named storage location

x is now restricted to accept int data type

The data to be stored in this location should be compatible to datatype of x(*int*)



Implicit conversion or Auto conversion

byte b = 10; int i = b;

Explicit conversion : Need to use some syntax to *tell* the compiler to do a conversion.

int i = 10; byte b = (byte)i;

Variables Types

Types of Variables

A. Based on the type of value it contains

1. Primitive

int x = 20;

2. Reference

Student s = new Student()

B. Based on the purpose and scope of declaration

1. local

Block level variable

Inside method, Constructor, block, loop

2. instance

Object level variable

Each object have own variable

3. static

Class level variable

Only one copy is created

Need to use static keyword

- ✓ Within a class, there can be two variables with same name if and only if they are local and instance or local and static.
- ✓ local is accessed directly, instance is accessed through object name and static is accessed through class name.
- ✓ ***this*** keyword is used for pointing to current object/instance.

Function or Method

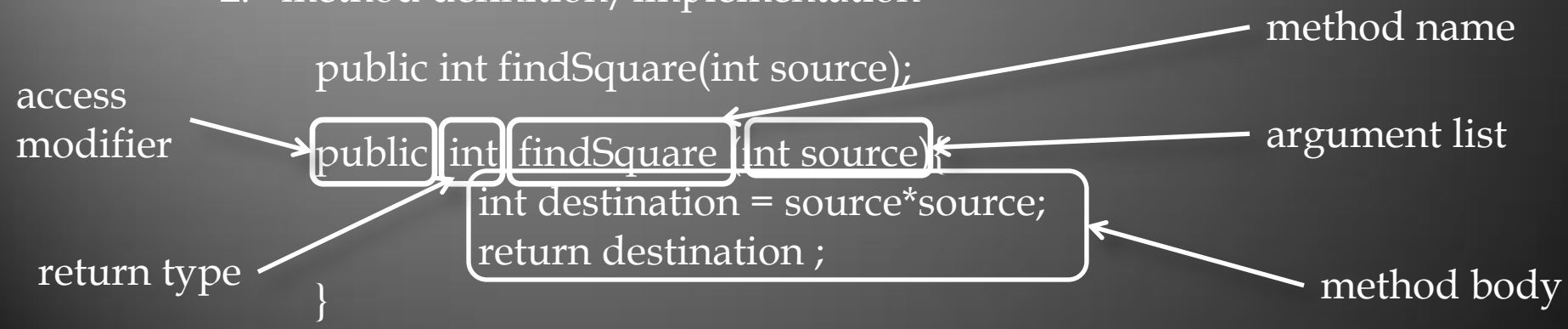
- ✓ It can be any action.
- ✓ Ex: eat, sleep, cleaning
- ✓ Example from Math: square, log
- ✓ It generally take some input and gives us some output

2 ⟶ Find Square ⟶ 4

Sandwich ⟶ Eat Food ⟶ You may not give any output

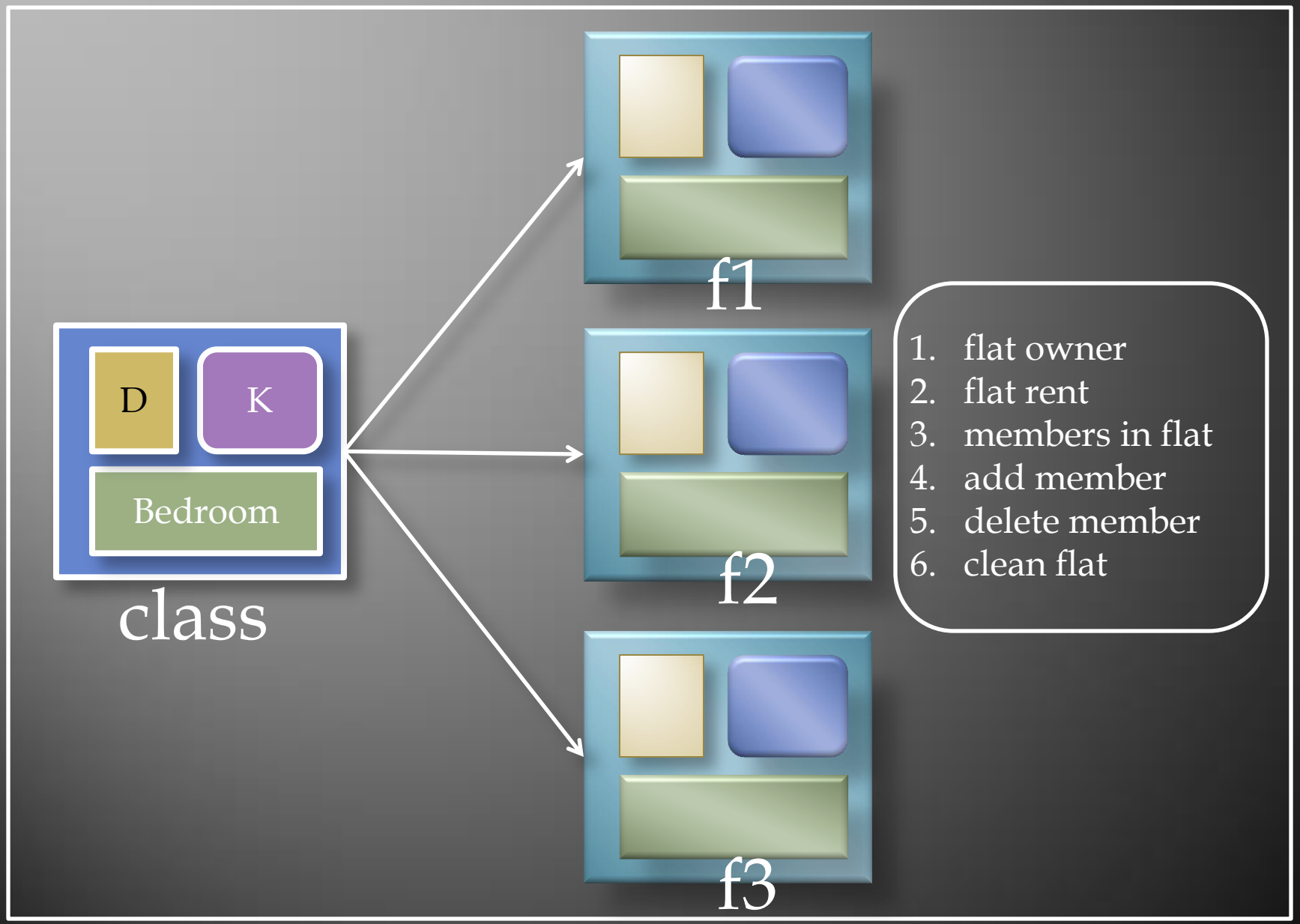
In Java, we call this kind of actions as method.
It is done in two steps:

1. method declaration
2. method definition/implementation



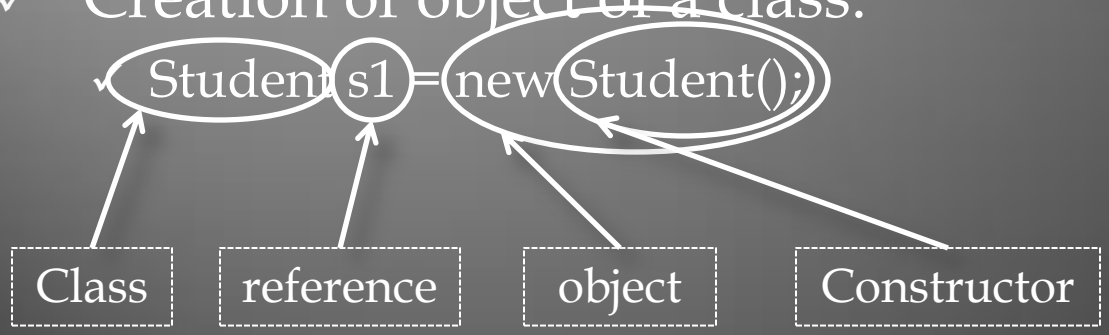
return type of a method can be void, primitive datatype or reference datatype

Class and Objects



Class and Objects(contd.)

- A class can be defined as a template/blueprint that describes the behavior/state that the object of its type support.
- An entity that has state and behavior is known as an object. Object is an instance of class.
- Here state are variables and behavior are methods.
- Class doesn't have physical existence whereas objects have.
- Creation of object of a class:



Like variable is used to store literal, reference is used to store object

Constructor

- A constructor in Java is a block of code similar to a method that's called when an object is created.
- Two types of Constructor
  - default constructor
  - parameterized constructor
- Constructor name must be same as Class name.
- Constructor doesn’t have return type where method have.
- Constructor is called only once during object creation where as method can be called many times.
- Constructor is generally used to initialize state of an object.
- The java compiler provides a default constructor if the class don’t have any constructor.

String

- It is a reference data type. It is immutable.
- Immutable simply means not modifiable.
- String Constant pool : It is a pool where only one copy of distinct String literal are stored.
- It helps in saving memory at runtime by preserving immutable strings in a pool so that others areas of the application can reuse instances of common strings instead of creating multiple instances of it.
- String construction:
  - String s1 = “Ram”;
  - String s2 = new String(“Ram”);
- Content and Reference check :
  - operator == returns true, when both references point to same object.
  - equals() method of String class returns true, when the content inside both the objects are same.

String API

char	charAt(int index)
String	valueOf(prim p)
boolean	isEmpty()
int	length()
String	trim()
String	toLowerCase()
String	toUpperCase()
int	compareTo(String str)
int	compareToIgnoreCase(String str)
boolean	equals(Object anObject)
boolean	equalsIgnoreCase(String str)
boolean	startsWith(String prefix)
boolean	endsWith(String suffix)
boolean	contains(CharSequence s)
String	concat(String str)
String	substring(int beginIndex)
String	substring(int beginIndex, int endIndex)

String API(contd.)

String	replace(char oldChar, char newChar)
String	replace(String target, String word)
String	replaceFirst(String regex, String word)
String[]	split(String regex)
String[]	split(String regex, int limit)
char[]	toCharArray()
int	indexOf(int ch)
int	indexOf(int ch, int fromIndex)
int	indexOf(String str)
int	indexOf(String str, int fromIndex)
int	lastIndexOf(int ch)
int	lastIndexOf(int ch, int fromIndex)
int	lastIndexOf(String str)
int	lastIndexOf(String str, int fromIndex)

Arrays

- An indexed collection of fixed no of homogeneous data elements.
- We can represent multiple values under the same name. Improves code readability.
- Can be of 1D, 2D, 3D……. nD. Popular are 1D and 2D.
- Declaration
  - int[] a;
  - int a[];
  - int []a;
- Construction
  - int[] a = new int[3]; a[0] = 1; a[1] = 34; a[2] = 54;
  - String[] s = {“Ravi”, “Lakshmi”, “Shyam”, “Ramesh”};
- length: It has a final variable only for arrays
  - <array name>.length will give the length of array
  - Here, a.length = 3 and s.length = 4.