Computer Science 227
Introduction to Programming

Iowa State University

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Recap about designing Class

- Have the ability to define our classes.
- Class has: Instance variables, and methods
- Instance variable are private.
- Methods may or may not return values.
- Methods may or may not have parameters.
- Constructors of a class: provides initial values for instance variables.
- Default constructor: No parameter.
- Specific constructor: Has parameters. Can have multiple specific constructors.
- Application programs: Have main method—starting point of the program.
- Use “new” to create objects of a class (Exception String)
- Calling method: “objectname.methodname”
User Input

Programs that we have written does not interact with user. User should be able to specify the input.
Scanner is an in-built class of the Package: java.util.
java.util is not a default package. Have to import it explicitly using import statement.
import java.util.*
Can just say: import java.util.Scanner
Package contains several related classes. "*" imports all classes of the package.
Scanner

Scanner stdin = new Scanner(System.in)
Create a new Scanner object named stdin and associate with standard input–key board.
System.in is an object representing the input stream associated with keyboard.
Java treats input as a sequence of characters.
“23” is treated as character sequence “2” and “3”.
Should convert input stream to integers, real numbers etc.
Methods of scanner do the conversion.
nextDouble() converts the input stream to a real number. Returns the real number.
Scanner Methods

One for each primitive data type and for strings.

- `nextInt()`
- `nextDouble()`
- `nextChar()`
- `nextLong()`
- `next()`
- `nextLine()`
- `nextChar()`
- `..`
- `..`
Practice Problems

- Write a program that asks the user to enter two integers and outputs the sum. How about two real numbers?

- Write a program that asks the user to enter 5 integers and outputs the sum. How many variables are needed? Can you reduce the number of variables? Can you do with one variable or with zero variables?

- Write a program that asks the user to enter a string outputs the length of the string.

- Write a program that asks the user to enter two characters and outputs them in reverse order.
Primitive Types

- **byte**
  - 1 byte of memory
  - Range: −128 to 127

- **short**
  - 2 bytes of memory
  - Range: −32,768 to 32,767

- **int**
  - 4 bytes of memory
  - −2,147,483,648 to 2,147,483,647

- **long**
  - 8 bytes of memory
  - Approximate range $-9 \times 10^{18}$ to $9 \times 10^{18}$

- **float**
  - 4 bytes
  - 6 digits of precision

- **double**
  - 8 bytes
  - 15 digit precision
Assignment Statement

int x;
long y;
double z;
float f;
x = y; //not valid
y = x; //valid
x = z; //not valid
z = x; //valid

Order among types: byte, short, int, long, float, double

Assignment Statement

Type of LHS must be at least the type of RHS
Type Arithmetic Expression

int x;
long y;
double z;
x = x + y; //not valid
z = x + y; //valid

Type of an arithmetic expression: Largest type of the variables in the expression.
Type Casting

```java
int x;
long y;
double z; x = (int) y; x = (int) z;
```

Loss of information.