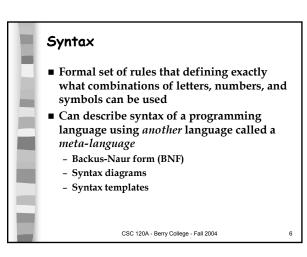


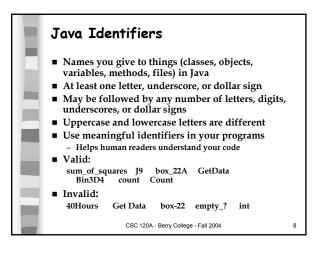
### Review Chapter 1 Goals To understand what a computer program is To know the three phases of the software life cycle To understand what an algorithm is To learn what a high-level programming language is To understand the difference between machine code and bytecode To understand compilation, execution, and interpretation To learn the major components of a computer and how they work together ALU, control unit, memory, input, output, auxiliary storage ALU + control = CPU (central processing unit)

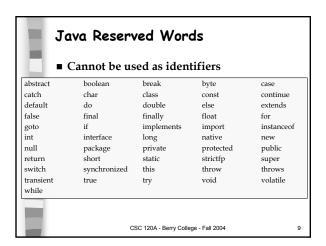
# Chapter 1 Review, cont. Be able to... Distinguish between hardware and software List the ways of structuring code in a Java application - sequence, selection, loop, subprogram Name several problem-solving techniques Identify the objects in a problem statement

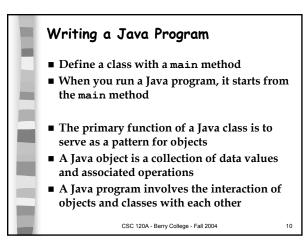
# Writing Java Programs Writing programs in any language requires understanding the syntax and semantics of the programming language as well as language-independent skills in programming Syntax is similar to rules of spelling and grammar: i before e except after c Semantics is what a program (or English sentence) means Natural languages are more forgiving than programming languages

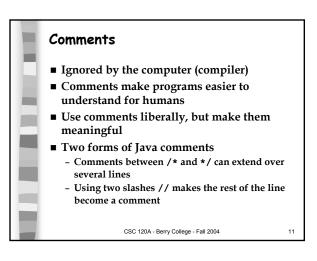


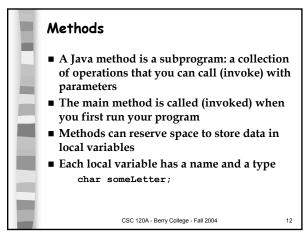
## Java Identifiers (Names) in BNF <identifier> ::= <letter> | <letter> <ltr-dgt-seq> <|ttr-dgt-seq> ::= <ltr-dgt> | <ltr-dgt> <ltr-dgt-seq> <|ttr-dgt> ::= <letter> | <digit> <|etter> ::= \_ | \$ | A | B | ... | Z | a | b | ... | z <|digit> ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 CSC 120A - Berry College - Fall 2004











### Assignment and Expressions

■ We set or change the value of a variable using an assignment statement

```
someLetter = 'A';
```

- Only one variable can appear to the left of =
- To the right of = is an expression
- Value of the expression must have the same type as the variable
- An expression is an arrangement of identifiers, literals, and operators that computes to a value of a given type
- To evaluate means to compute a value by performing a set of operations on given values

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### Data Types: char

- char describes data consisting of one alphanumeric character - letter, digit, or special symbol
  - To write a char, use single quotes:

'A' 'a' '8' '2' '+' '%' '?' '.'

 Use escape sequences for single quote and backslash:

′\″ ′\\′

- Each char is stored at an address in memory
  - Reference the address using a variable identifier
- char is a primitive Java data type

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### Example program: char

```
public class CharLecture {
   public static void main(String args[]) {
      char someCharacter;
      char someLetter = 'Y';
      someCharacter = '?';

      System.out.print(someLetter);
      System.out.println(someCharacter);
}
```

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### Data Types: String

- A string is sequence of characters, enclosed in double quotes
- The String class is a Java Object type
- Strings in Java are objects (instances of the String class)

"This is " "a String"

- Must be typed all on one line between " "
- Can use escape sequences: "She said, \"Hi!.\""
- Example program: PrintAName.java

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### Assignment: Primitive Types vs. Objects

- For a primitive type, the value is stored in the memory location corresponding to the variable identifier
  - Assigning primitive type variables to each other means copying the value in memory
- For objects, a variable contains a value that is the memory address where the actual object is stored
  - Java automatically finds the object in memory using the address (we don't worry about it)
  - But, assigning object variables to each other means copying addresses, not the entire object

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### Method definitions

- Methods are defined by a heading and a block (of statements)
- Heading tells:
  - Modifiers (access, etc.)
  - Return type
  - Name
- Parameters
- Block is a sequence of statements enclosed in a pair of braces: { <statements> }
  - For code readability, we indent the body of a block

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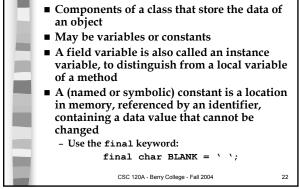
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### ■ Use the name of the method ■ Use the name of the method ■ If the method is defined in the same class, just use the name ■ If the method is defined in another class, need to use the name of the class or an object, followed by a. (dot) ■ Example: System.out.println("Hello"); ■ Pass appropriate arguments, enclosed in parentheses, matching the parameter types

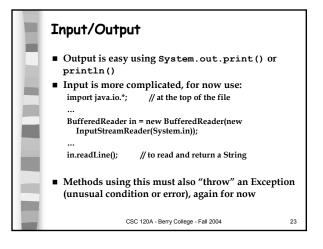
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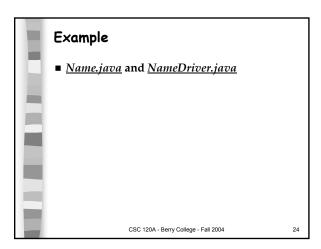
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### Value-returning Methods Methods can return a result value public int addTwo(int a, int b) { return a + b; } ... int result = addTwo(5,19);



Fields





### Recap: Types of Methods Class methods

- Associated with a class instead of object instances
- Defined with the static modifier
- Instance methods
  - Methods that operate on the data of an object
- Constructors
  - Special methods called automatically when you create a new object of a class
  - Name must be exactly the same as the class
  - Do not specify a return type (like void)
- Void methods
- Value-returning methods
- Helper methods
  - Declared privately in a class; used internally

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### Recap: Java Applications

- A class or classes containing fields and methods
- Fields: identifier and type
  - Can be variables or constants
- Methods: declarations, statements, expressions, method calls, input, output
- **■** Comments
- One class contains the main method

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