CH1 Object-oriented software principles

Object – (1) The primary software construct in the object-oriented paradigm. (2) An encapsulated collection of data variables and methods. (3) An instance of a class.
Attribute -
Method – A named group of declarations and programming statements that can be invoked (executed) when needed. A method is part of a class.
Class – (1) A java reserved word used to define a class. (2)The blueprint of an object-the model that defines the variables and methods an object will contain when instantiated.
Encapsulation - The characteristic of an object that limits access to the variables and methods contained in it. All interaction with an object occurs through a well-defined interface that supports a modular design.
Inheritance – The ability to derive a new class from an existing one. Inherited variables & methods of the original (parent) class are available in the new (Child) class as if they were declared locally.
Polymorphism – An OO technique by which a reference that is used to invoke a method can result in different methods being invoked at different times. All java method invocations are potentially polymorphic in that they invoke the method of the object type, not the reference type.

CH2 Character Stings (// = comment)

print & println methods – represent two services provided by the System.out object.
string concatenation ("string" + "concatenation").
escape sequences meaning (\b = backspace) (\t = tab)(\n = newline)(\r = carriage return)(\" = double quote)(\' = single quote)(\\ = backslash)

A variable is a name for a memory location used to hold a value of a particular data type.
Accessing data leaves it intact in memory, but an assignment statement overwrites the old data.
We cannot assign a value of one type to a variable of an incompatible type.
Constants hold a particular value for the duration of the existence.
Java has two kinds of numeric values: integer and floating point. There are four integer data types and two floating point data types.

byte	8 bits	-128 to 127
short	16 bits	-32,768 to 32,767
int	32 bits	-2,147,483,648 to 2,147,483,647
long	64 bits	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
float	32bits	-3.4E+38 (w/7 significant digits) to 3.4E+38 (w/7 significant digits)
double	64 bits	-1.7E+308 (w/15 significant digits) to 1.7E+308 (w/15 significant digits)
char	character	(8bits?)
booleans	true or false	1 or 0 (1bit)

Expressions are combinations of operators and operands used to perform a calculation.
Arithmetic Operator – An operator that performs a basic arithmetic computation, such as additional or multiplication.
Operator Precedence – The order in which operators are evaluated in an expression as specified by a well-defined hierarchy.

Java follows a well-defined set of precedence rules that governs the order in which operators will be evaluated in an expression

Precedence Level	Operator	Operation	Associates
1	+	unary plus	R to L
	-	unary minus	
2	*	multiplication	L to R
	/	division	
	%	remainder	
3	+	addition	L to R
	-	subtraction	
	+	string concatenation	
4	=	assignment	R to L

Assignment Operators – An operator that results in an assignment to a variable.int base = 25;
??Data Conversion1.7E+308 (w/15 significant digits)
Narrowing conversions should be avoided because they can lose information.
Java widening conversions = small can get bigger Java narrowing conversions = big can get smaller
Assignment conversion – Some data types can be converted to another in an assignment statement.
Promotion -
Casting -

The Scanner class provides methods for reading input of various types from various sources.
Graphical data is represented by dividing it into many small pieces called pixels.
Java's coordinate system has the origin in the upper-left corner and all visible coordinates are positive.
Colors are represented in Java using an RGB value-three values that represent the contributions of the primary colors red, green, and blue
The Color class contains several predefined colors that are commonly used, and can be used to define many others.
Applets are Java programs that are usually transported across a network and executed using a Web browser.
Most shapes can be drawn filled (opaque) or unfilled (as an outline).
A bounding rectangle is used to define the position and size of curbed shapes such as ovals.
An arc is a segment of an oval beginning at a specific start angle and extending for a distance specified by the arc angle.

CH 3 Creating Objects
The new operator returns a reference to a newly created object.
Multiple reference variables can refer to the same object.
Usually a method is executed on a particular object, which affects the results.
A class library provides useful support when developing programs.
The java standard class library is organized into packages.
All classes of the java.lang package are automatically imported for every program.
A pseudorandom number generator performs a complex calculation to create the illusion of randomness.
All methods of the Math class are static, meaning they are invoked through the class name.
The pringf method was added to Java to support the migration of legacy systems.
Enumerated types are type-safe ensuring that invalid values will not be used.
A wrapper class allows a primitive value to be managed as an object.
Autoboxing provides automatic conversions between primitive values and corresponding wrapper objects.
Containers are special GUI components that hold and organize other components.
A frame is displayed as a separate window, but a panel can only be displayed as part of another container.
Every container is managed by a layout manager.
Panels can be nested to create an intricate containment hierarchy of components.
A label can contain text, an image, or both.

CH 4 Classes and objects revisited
The heart of object-oriented programming is defining classes that represent objects with well defined state and behavior. The scope of a variable, which determines where it can be referenced, depends on where it is declared. A UML class diagram helps us visualize the contents of and relationships among the classes of a program. An object should be encapsulated guarding its data from inappropriate access. Instance variables should be declared with private visibility to promote encapsulation.
Most objects contain accessor and mutator methods to allow the client to manage data in a controlled manner.
The value returned from a method must be consistent with the return type specified in the method header.
When a method is called, the actual parameters are copied in to the formal parameters.
A variable declared in a method is local to that method and cannot be used outside of it.
A constructor cannot have any return type, even void.
A GUI is made up of components, events that represent user actions and listeners that respond to those events.
Listeners are often defined as inner classes because of the intimate relationship between the listener and the GUI components.

CH 5

Conditionals and loops allow us to control the flow of execution through a method.
An if statement allows a program to choose whether to execute a particular statement.
A loop allows a program to execute a statement multiple times.
Java equality relational operators (equal to ==, not equal to !=, less than <, less than or equal to <=,greater than >, greater than or equal to >=)

Java logical operators

Operator	Description	Example	Result
!	logical NOT	! a	true if a is false and false if a is true
&&	logical AND	a && b	true if a and b are both true and false otherwise
||	logical OR	a || b	true if a or b or both are true false otherwise

Logical operators are often used to construct sophisticated conditions.
Proper indentation is important for human readability; it shows the relationship between one statement and another.
An if-else statement allows a program to do one thing if a condition is true and another thing if the condition is false.
In a nested if statement, an else clause is matched to the closest unmatched if.
The relative order of characters in Java is defined by the Unicode character set.
The compareTo method can be used to determine the relative order of strings.
A break statement is usually used at the end of each case alternative of a switch statement.

Class Midterm Review

Classes Instance or class variables instance or class methods class == static
No return type = Constructor (is a method) builds instances of classes

Constructor –
Applet first calls INIT then calls paint Application first calls MAIN to call Application in command line java mylab5
Control Statements -
Sequence -
Method call -
Decision statements -
Signature -
Polymorphism = overloading same signature different parameters
Over righting-
Suppose x=10 and y=10 what is x after evaluating the expression (y > 10) & (x++ > 10). x=11
Explanation: For the & operator, both operands are evaluated.

Suppose x=10 and y=10 what is x after evaluating the expression (y > 10) && (x++ > 10). X=10
Explanation: For the && operator, the right operand is not evaluated, if the left operand is evaluated as false.

uppose x=10 and y=10 what is x after evaluating the expression (y >= 10) | (x++ > 10). x=11
Explanation: For the | operator, both operands are evaluated.

Suppose x=10 and y=10 what is x after evaluating the expression (y >= 10) || (x++ > 10). x=10
Explanation: For the || operator, the right operand is not evaluated, if the left operand is evaluated as true.

The Integer.parseInt(s); method parses a string s to an int value.
The Double.parseDouble(s); method parses a string s to a double value.
The System.currentTimeMills() returns the current time in milliseconds since midnight, January 1, 1970 GMT (the Unix time).
The switch control variable cannot be double