

cse@buffalo

CSE115 / CSE503 Introduction to Computer Science I **Dr. Carl Alphonce** 343 Davis Hall alphonce@buffalo.edu Office hours: Tuesday 10:00 AM – 12:00 PM* Wednesday 4:00 PM – 5:00 PM Friday 11:00 AM - 12:00 PM OR request appointment via e-mail

*Tuesday adjustments: 11:00 AM – 1:00 PM on 10/11, 11/1 and 12/6



Last time

Primitives

ROADMAP

Today Control structures Coding exercises!

Coming up Collections

ANNOUNCEMENT



DESIGN = BUILD = EXPLORE = INNOVATE

24-HR CODING COMPETITION = = =

Food, prizes, mentors, hardware, swag. We've got it all covered.

NOVEMBER 5-6, 2016

UNIVERSITY AT BUFFALO

REGISTER AND LEARN MORE @ UBHACKING.COM Registration closes this Sunday (10/23) @ 11:59PM

Reserve <u>your</u> spot as soon as possible!

REVIEW



cse@buffalo

orimitive type: boolean

the boolean type has two values, **true** and **false**

boolean operators: && (and), || (or) and ! (not)

P	Q	P && Q	P Q	!Q
true	true	true	true	false
true	false	false	true	true
false	true	false	true	-
false	false	false	false	-

examples:

boolean x; x = true; boolean y = false; boolean z = x && y;

- // declaration
 // assignment
- // combined
- // using && operator



.cse@buffalo

the int type includes integral values in a given range (we'll return to this in a later lecture): 0, +1, -1, +2, -2, ...

int operators:

- +, integer addition
- -, integer subtraction
- *, integer multiplication
- /, integer division (quotient)
- %, integer remainder

(operator type is int \times int \rightarrow int) (operator type is int \times int \rightarrow int)

examples:

```
// q has value 1
// r has value 2
// note: x = q * y + r
```

MOVING ON

.cse@buffalo

static methods

a static method is invoked on a class, rather than an object a static method has no access to instance variables its invocation record has no 'this'

static variables

a static variable is accessed via a class, rather than an object a static variable is often declared 'public' a static variable is often given a name of all upper-case letters, as in java.awt.Color.RED



public static void main(String[] args) {

main method

main method is standard entry point for a Java program

main method is invoked by Java runtime system

static

reserved word

}

...

indicates member is associated with CLASS not INSTANCE

parameter of main

square brackets are special syntax used with arrays we will discuss arrays at start of CSE116

the parameter 'args' is initialized with 'command line arguments' – arguments given on the command line when the program is run



University at Buffalo The State University of New Yo

The System class is defined in the java.lang package.

The name 'System' can therefore be used in an unqualified way, even without an explicit import directive.

cse@buffalo

'out' is a public and static variable of the System class, whose type is PrintStream

The 'PrintStream' class defines a static method named 'println'

'println' accepts an argument of any type, and prints a textual representation of the argument on the console (see the output in the console view if running in Eclipse, or the terminal window from which the program was started if running outside of Eclipse).

CONTROL STRUCTURES



cse@buffalo

Recall that not every language is a programming language

A programming language must be able to express

sequence selection

repetition

In Java

sequence can be expressed by the order of statements and the nesting of expressions

selection can be expressed by conditional statements (if statement, ifelse statement), as well as by polymorphism

repetition can be expressed by looping statements (while statement, for statement, foreach statement)

There are additional ways in which selection and repetition can be expressed (e.g. pattern matching, unification / recursion)

University at Buffalo



conditional statements (SELECTION) if-else statement if statement

loop statements (REPETITION) while statement (while loop) for statement (for loop)

Control Structures

\rightarrow selection

\rightarrow if-else statement

if (<expr>) <stmt₁> else <stmt₂> false true <expr> <stmt₂><stmt₁>



cse@buffalo

```
public void message(int x) {
    if (x == 4) {
        System.out.println(" leaf clover!");
    }
    else {
        System.out.println("Sorry :-(");
    }
    System.out.println("Play again!");
```

}

Control Structures

\rightarrow selection

\rightarrow if statement

if (<expr>) <stmt>





cse@buffalo

public void message(int x) { if (x == 4) { System.out.println(" leaf clover!"); } System.out.println("Play again!");

}

PAIR CODING EXERCISE



	Grab File	Edit Capt	ure Window	Help					🕥 🕸 🗃 b	▲ -0 🖇 🤅	🔊 🔽 🜓) 75% 🔳	∎ <mark>• Wed</mark> Oct 19 11:56 Q	、 🌏 😑
	000				Java	- Eclipse - /Users/al	phonce/Documents/ ⁻	Teaching/Fal	2016/cse115/work	kspace			
· 🔽	i 📬 • 🖬 • 🖪 🦷	🔌 😼 🎋	• • • • • • •	3• 😂 😕	🔗 • 🗄 • 🖓 • 🏷	↓ → ▼			Quick	Access	🐉 Java ີ 🔠 Git 🔒	CVS Repository Exploring 旹 Tear	n Synchronizing
·	Package	Explorer 🛛	E 😫 🗧 🕇									🗏 Task Li 🗦 Outline	e 🛛 🗖 🗖
•	▶ 🛱 Lecture	Code [tim	berlake.cse.l	buffalo.									5 ▼
	Lootaro	Codo Lan										An outline is not available.	-
. . .													
•													
· 🕥													
•													
0													
• 19													
-													
۲													
2													
. 🕅													
S				(🔊 Drahlanaa 🕅	🖉 Jawada a 🖪	Declaration						
\bigotimes						🦉 Javadoc 🖳	Declaration						e.
人					Description		^ Resource	Path	Location	Туре			
.													
0													
9													
50													
-													
1													
1													
1											A 14		
-											<u>8</u>		

Ć	Grab File Edit Capture Window Help			6	😝 🗃 b 🛆 🖯	* 🗟 🔽	()) 75%)• Wed Oct 19 11:56 🔍 🌏 😑
		Java - Eclipse	- /Users/alphonce/Documents/1	eaching/Fall20	016/cse115/workspace) 		
	➡ + 🖹 🐘 🔌 😽 🍫 • 🔾 • 🏪 🗳 • 🕭 ⊆	シℛ•リ៉ѯ・ᅒ・やゆ・→・			Quick Access	📃 📑 😫 Java	a 🔚 Git 🔠 CV	VS Repository Exploring 旹 Team Synchronizing
	🔰 Package Explorer 🛛 🖻 😫 💿 🔻 🗖 🗖							🗏 Task Li 🔚 Outline 🛚 🗖 🗖
	► LectureCode [timberlake.cse.buffalo.							5ª V
								An outline is not available.
		10						
w	New	Z Java Project						
	Show In ℃₩W ►							
	🖺 Сору 🛛 🖧 С	Package						
	Copy Qualified Name	O Class						
	Te Paste XV							
19	🗙 Delete 📧	@ Annotation						
Ξ	🚵 Import	💕 Source Folder						
	🎦 Export	/ Java Working Set						
()	🔗 Refresh F5	Ger Folder						
80	Open Project	File						
 ● → 		Unit Test Case						
		Task						
않고		📑 Example						
		Cher ₩N						
S		Problems 🕅 @ Jav	adoc 🖲 Declaration					» v
\bigcirc		0 items						
<u>}</u>		Description	^ Resource	Path	Location	Туре		
õ								
~								
U							6	

Ú	Eclipse	🛞 😂 🔁 b 🕭 🕙 🖇 🤶 💵 🐠 75% 🔳	D• Wed Oct 19 11:57 C	K 🌏 😑
	•••	New Java Project		
	📑 • 🖬 • 🖩 🐚 🔌 😽 🗞 • 🕥 • 🂁 •	Create a Java Project	/S Repository Exploring 🖆 Tear	m Synchronizing
•	🛿 Package Explorer 🛛 🖻 😫 🕯	Create a Java project in the workspace or in an external location.	🗏 Task Li 🔚 Outlin	e 🛛 🗖 🗖
0	► Career Code [timberlake.c.		An outline is not available	a ∠
×I		Dreiget name: Ev01	All outline is not available.	
0		Use default location		
		Location: /Users/alphonce/Documents/Teaching/Fall2016/cse115/workspace/Ex Browse		
•		JRE		
• 19				
		Use an execution environment JRE: JavaSE-1.7		
		O Use a project specific JRE: □Java SE 8 [1.8.0.11] ○		
8		Use default JRE (currently 'Java SE 8 [1.8.0_11]') <u>Configure JREs</u>		
_ - €				
		Project layout		
2		Use project folder as root for sources and class files		
C				
Q 		• Create separate folders for sources and class files <u>Configure default</u>		
S		Working sets		
.		Add project to working sets		
0		working sets:		
6				
		? < Back Next > Cancel Finish		

🗯 Eclipse	File Edit Source I	Refactor 1	Navigate	Search F	Project	Run	Window	Help		⊚ ₩	🔁 b 🛆	0 * 🤅	· 🔽 🜓)	74% 🔳	Wed Oct 19 11:59		三
				J	ava - Ecl	lipse - /l	Jsers/alpho	once/Documents/	Teaching/Fa	all2016/cs	e115/workspac	e,					
	a i 😺 i 😼 i 🎋 • 🕥 • 🎴	• 🕆 😋	800	?• 철•₩	*\$ \$						Quick Acce	ss 🛛 🖻 🔮	🐉 Java 🔒	Git 🛃 CV	'S Repository Exploring	Team Syr	nchronizing
📕 💷 Package	e Explorer 🛛 🖻 😫	; ;• ▽ □	' 🗆												🗏 Task Li 🔡 O	utline 🛛	3 - 0
▼ ² Ex01																	·
src 🕮	Nou			dê Java De											An outline is not available	e.	
JRE :	S			🔁 Java Pr	oject												
► 🗠 .sett	Green UML			- Troject	•••												
🗴 🗈 .clas	SI Open Type Hierard	low chv	F4	Packag	e												
🖻 🛛 🖹 🔊	e Show In	い。 てまい	W ►	Class	20												
▶ ➡ Lecture	e(🕞 Copy		жс	Fnum													
	Copy Qualified	Name		Annota	tion												
	🛅 Paste		жv	💕 Source	Folder												
	🔀 Delete		\boxtimes	/ Java W	orking S	Set											
3	& Remove from C	Context	18分3	Folder													
3	Build Path		•	File	d Tavt Fi	ilo											
8	Source	7585	S 🕨	Unit T	est Case	e											
	Refactor	75 第1	T 🕨	Task	001 0401	•											
X	🔤 Import			E Evennel			-										
	찶 Export			Example	e												
7	🔗 Refresh		F5	📑 Other		ЖN											
	Assign Working Se	ets															
	Run As		•														
Â	Debug As																
5	Validate		R	Problems	; X @	Javad	loc 🗟 D	eclaration								59	~
	Compare With		it	ems													
2	Restore from Loca	l History	e	scription				^ Resource	Path		Location	Туре					
	Maven		•														
5	Properties		жı														
a																	
src - Ev01														A- 1:			

Ć	Eclipse				() \$	🄰 🔁 b 🛆 🤆	🕚 🕴 🤶 🔽 🜒 74%	🔲 · Wed Oct 19 12:00 오 🎅 😑
•			Java - Eclipse - /Users/alphonc	e/Documents/Tea	aching/Fall2016/	cse115/workspac	e	
	📑 • 🖬 • 🗏 🐚 🔌 😽 • 💽 • 🂁 •	₿ ©• 😂 🗁 🔗 •	≝ • व • ጭ ⇔ •			Quick Acces	ss 🚺 😭 🐉 Java 🔚 Git 🚦	CVS Repository Exploring 💾 Team Synchronizing
	🔰 🖻 🖻 😫 🕼						- E	🗏 🗏 Task Li 🔚 Outline 🛚 🗖 🗖
	▼							
©© x∎	/ [™] src							An outline is not available.
	▶ 🛋 JRE System Library [JavaS			New Java Packa	ige			
WI	► 🗁 .settings	Java Package	1					
	🗷 .classpath	Create a new	lava nackada					
	🗷 .project	Create a new	Java package.					
	► LectureCode [timberlake.cs	Creates folders	s corresponding to packages.					
		Source folder:	Ex01/src				Browse	
19		Namo:						
			quiz					
		Create packa	age-info.java					
83								
●								
× 6								
1								
7								
S						<u> </u>		
		\odot				Cancel	Finish	
<u>~</u>		Descrip	DUON	 Resource 	Paun	Location	туре	
٢								
9								
500 []								
~								
G								
	src - Ex01						87	a

Ć	Eclipse File Edit	Source Refactor	Navigate Sea	rch Project Run	Window	Help	6	😌 🔁 b 🙆	⊕ * 🤶	🔺 📢)) 74% 🔳	Wed Oct 19	12:00 Q 🄇	
-				Java - Eclipse -	/Users/alph	once/Documents/1	Teaching/Fall20	016/cse115/workspa	ce				
	📑 • 🖆 • 🗄 🐚 🔌 😽	🎋 • 🖸 • 🎴 • 🖶 😋 •	1 🤭 😂 🔗 🕇 🖄	• {A • \$ \$ • • • •				Quick Acce	ess 📔 🖻 💐	Java 🔐 Git 🛃 C	VS Repository Explo	ring ^{音0} Team Sync	chronizing
	 Package Explore ExO1 ✓	er 🛛 🖻 😫 💿 🔻 🖻	•								Task Li	🗄 Outline 🛛	- □
	 ■ JRE System ■ JRE System ■ settings ■ classpath Project ■ LectureCode 	New Green UML Open in New Window Open Type Hierarchy Show In Copy Copy Qualified Na Copy Qualified Na	× y T.₩W %C %C %C %C %C %C %C %C %C %C	 Java Project Project Project Package Class Interface Enum Annotation Source Fold Java Workin Folder File Untitled Text JUnit Test C Task Example Other 	er g Set t File tase %N								
		Run As Debug As Validate Team Compare With Restore from Local H Properties	History	ems 🛛 @ Java	adoc 🖳 D	A Resource	Path	Location	Type			\$r •	
	quiz - Ex01/src									R 1			

Ú	Eclipse		🛞 🕸 🔁 b 🙆 🕚	* 🔶 🔽 🜒 74% 🛙	<u>)</u> Wed Oct 19 12:01 🔍 🌏 😑
			New Java Class		
	📬 • 💼 • 📄 🔌 🔯 🚸 • 🕥 • 🂁 • 🖯	Java Class			/S Repository Exploring 昔 Team Synchronizing
·	ቹ Package Explorer 🛛 🖻 😫 🔮	Create a new Jav	a class.		🗏 Task Li <table-cell-rows> Outline 🛛 🖱 🗖</table-cell-rows>
•	▼ 😂 ExO1				\$• ▼
×I	▼ [®] SrC	Source folder:	Ex01/src	Browse	An outline is not available.
• •	⊕ quiz	Package.		Browse	
	Settings		4	Browso	
· 😽	isettings isettings isettings iset			DIOWSe	
• 3	🗷 .project	Name:	Question		
	► Cale LectureCode [timberlake.c:	Modifiore:			
• 19		Moumers.			
		0		Drewee	
		Superclass:	Java.lang.Object	Browse	
82		Interfaces:		Add	
 				Remove	
			he would you like to create?		
2		which method stu	Ibs would you like to create?		
Q			Constructors from superclass		
		Do you want to ad	Internet abstract methods d comments? (Configure templates and default value here)		
		Do you want to au			
≁			O Generate comments		
ō					
		?	Cancel	Finish	
<u> </u>					
63					
<u>_</u>					
	quiz - Ex01/src			<u> 6</u>	

It Aues 100 / perceptiv/Covening / Parcing Parce / Parc	Grab File Edit Capture Window Help			⊚ ≎	🔁 b 🛆 🗧	0 * 🤶 🗸	()) 74% ()• Wed Oct 19 12:01 🔍 🌏 😑
Package Explorer X R Package Explorer X Package Explorer X Package E		Java - Ex01/src/quiz/Question.java - Eclipse	- /Users/alphonc	e/Documents/Teachi	ing/Fall2016/c	se115/workspa	се	
It Package Explorer x It Package Explorer x It Package Explorer x It Package explorer x It Package Explorer x It package quiz; It package quiz; It package quiz; It package explorer x It package explorer x It packa	🗧 🖆 • 🖆 • 🖩 🐘 🔌 😼 🔯 • 💽 • 🎴 • 🛱 🞯 • 🖻	→ 🖋 + : 🍄 🌌 🤝 💷 🕥 🤮 + 🖓 + 🏷 🔶 + 🖃	v		Quick Acces	s 🛛 🖻 🖶 J	ava ີ Git 🛃 C	/S Repository Exploring
Poly Rol Poly Rol	📕 🛿 Package Explorer 🛛 🖻 😒 💿 🔻 🗖 🗖	☑ Question.java ☎						🗏 Task Li 🔚 Outline 🛛 🗖 🗖
<pre>** Src ** Src ** Question.java ** JRE System Library (JavaSE-1.7) ** JRE System Library (JavaSE-1.7) ** LectureCode (timberlake.cse.buffalo. ** Decemberlake.cse.buffalo.</pre>	▼ ² Ex01	1 package quiz;						💱 📄 📮 🙀 🗙 🖋 👄 🗙 💆 🤝
* B quiz * Question java * J J Question java *	The src	2						# quiz
Ouestion.java All RS System Library [JavaSE-1.7] All RS System Library [JavaSE-1.7] All RE System Library [JavaSE-1.7] All Research and the second	T = quiz	3 public class Question {						Question
**J.RE System Library [JavaSE-1.7] **	Question.java	4 5 1						
• Sestings • Casspath • Casspath • Cooler • Cooler • Cool	✓ ► ▲ JRE System Library [JavaSE-1.7]	6						
Construction Type	·今 ▶⊱.settings							
Resource Path Location Type	Classpath							
Contraction Otems	.project							
	► LectureCode [timberlake.cse.buffalo.							
Problems % Javadoc % Declaration Otes Description Resource Path Location Type								
Problems X Javadoc R Description Resource Path Location Type Image: Second Secon								
Problems 22 Problems 23 Problems 23 Problems 24								
Problems X Javadoc R Declaration O items Description Resource Path Location Type Image: Comparison of the second comparison of the s	88							
Problems 23 Ditems Ditems Description Resource Path Location Type Ditems Ditems Ditems Description Resource Path Location Type Ditems Description Resource Path Location Type								
Problems X Javadoc Decirption Resource Path Location Type Image: Comparison of the comparison of t	(文)							
Problems Si @ Javadoc Declaration 0 items Description • Resource • Resource • Internet • Internet <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>								
Problems X O items Description Resource Path Location Type O items Description Resource Path Location Type O items Description Image: Description <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>								
Image: Second Secon								
Image: Second Secon	0							
Problems X Javadoc Description Nesource Description Nesource Path Location Type Image: Second Se	• 🕅							
O items O items Description	S	Problems 🕅 @ Javadoc 🔒 Dec	laration					· · ·
Image: Solution Image: Solution </th <th></th> <th></th> <th>aration</th> <th></th> <th></th> <th></th> <th></th> <th></th>			aration					
Image: set in the set in		Description	^ Resource	Path	Location	Туре		
Image: state stat								
Image: state stat								
Image: Section of the section of th								
Image: Comparison of the state of the s								
Image: Second	. 😇							
	23							
Writable Smart Incert 1 - 1	Ŭ				hle Sn	aart Insert	•1 :	

PAIR CODING EXERCISE

Define a class quiz.Question. In this class define a method named answer.

Define this method so that it returns true if its int argument is negative, and false otherwise.

Submit to Exercise-01 in Web-CAT – enter the usernames of everyone in your group!

Enter the usernames of any partners who are working with you on this assign	nent, separated by commas or whitespace	. If you are working individually, leave	this
field blank.			

Partners:

You have 8 minutes to complete this exercise.

PAIR CODING EXERCISE

Define a class quiz.Question. In this class define a method named answer.

Define this method so that it returns true if its int argument is negative, and false otherwise.

Submit to Exercise-01 in Web-CAT – enter the usernames of everyone in your group!

Enter the usernames of any partners who are working with you on this assignment, separated by commas or whitespace. If you are working individually,	leave this
field blank.	

Partners: username

You have 8 minutes to complete this exercise.