APPENDIX: INSTALLING AND USING CHECKSTYLE WITH UNC-CHECKS (PROCESS DEPENDS ON OS AND ECLIPSE VERSION)

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WHAT IS CHECKSTYLE?

- A tool that checks your source code to ensure that your code meets requirements specified by a configuration file.
- There are many configuration files that use predefined Checkstyle checks.
 - Sun Checks
 - Google checks
- All check are assignment independent.
- Very few assignment-dependent checks have to do with code structure —they address naming, formatting, comment stricture, and other issues.
- Coding checks are sometimes too rigid
 - Magic numbers

WHAT IS UNC CHECKSTYLE

• Defines new code-structure checks

- More flexible magic number checks
- New kinds of assignment-independent checks e.g. side effects, code repetition, design patterns
- Assignment-dependent checks
- Different configuration files to exercise different assignment-specific checks.

CHECKSTYLE INSTALLATION AND USE INSTRUCTIONS

1. Install Checkstyle

2. Download Install Configuration Files

3. Invoke Checkstyle

INSTALLATION INSTRUCTIONS

- Checkstyle plugin is integrated with the difficulty plugin.
- Follow instructions for (un) installing difficulty plugin

Difficulty Plugin	<u>PowerPoint</u>
	<u>PDF</u>

CHECKSTYLE INSTALLATION AND USE INSTRUCTIONS

1. Install Checkstyle

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EXAMINE PROJECT PROPERTIES OF SOME PROJECT YOU WANT CHECKED

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File	Edit	Source	Re	factor	Navigate	Search	Project	Saro	s
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FINDING UNC CHECKS

⊜	Propert
type filter text	Checkstyle
Resource Builders	Main Local Check Configurations
Checkstyle FindBugs	Checkstyle active for this project
Git Java Build Path ▷ Java Code Style ▷ Java Compiler ▷ Java Editor Javadoc Location PMD Dreject References	Simple - use the following check configuration for all file UNC Checks - (Global) Description. UNC configuration

If you do not see the Checkstyle item in the left pane, then Checkstyle did not install properly

If you do not see the UNC Checks option then UNCChecks did not install properly

Do not give up if something goes wrong, please use Piazza and instructor help

CHECKSTYLE INSTALLATION AND USE INSTRUCTIONS

1. Install Checkstyle

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ASSIGNMENT SPECIFIC CHECKS?

e	Propert
type filter text	Checkstyle
Builders	Main Local Check Configurations
Builders Checkstyle FindBugs Git Java Build Path > Java Code Style > Java Compiler > Java Editor	Checkstyle active for this project Write formatter/cleanup config (experimental!) Simple - use the following check configuration for all file UNC Checks - (Global Description: UNC configuration
PMD Project References	

Every assignment has its own checks

Need to tell Checkstyle to use the correct checks for an assignment

ACCESS CHECKS FILE ON COURSE PAGE/FOLDER

On the course page, next to the link to an assignment is the checks file

Number Scanner

Checks File

DOWNLOAD ASSIGNMENT-SPECIFIC FILE



Now we need to tell Checkstyle to use it

SELECT PREFERENCES ECLIPSE SUB-MENU (WINDOWS AND MAC)

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On Windows it is a submenu of the Window top-level pull-down menu



On a Mac it is a submenu of the Eclipse top-level pull-down menu

SELECT CHECKSTYLE LEFT PANE ITEM

•	Preferences — 🗖 🗙
type filter text	Checkstyle $\diamond \bullet \bullet \bullet \bullet$
 General Ant Checkstyle Code Recommenc Communications Help Install/Update Java Maven Mylyn ObjectAid PlantUML Plug-in Developm Run/Debug Team Validation WindowBuilder XML 	General Settings Rebuild projects if needed: prompt ▼ Image: Setting Settin
< >	V Export
0	OK Cancel

You should see the same options you saw in project properties, but here we can add to the options

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-			•••	<u> </u>	

EXECUTING NEW COMMAND

Check Configuration Properti	es 🛛 🗙	
Check Configuration Create a new Check Configuration		Specify that you will load the
Type: External Configuration File Vame:		external file
Location:	Browse	
Description:		
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Protect Checkstyle configuration file		
Additional properties	OK Cancel	

BROWSE TO DOWNLOADED FILE

•	Open			×
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students	Name	Date modified	Туре	Size
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💐 This PC				
🐌 comp114-f03				
🐌 comp242-s04				
🔰 Desktop				
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Windows (C:)				
⇒ DATA (D:)				
Section (\\afs)	<			>
File <u>n</u> a	ame: unc_checks_401_f16_a1.xml		<pre>*.* <u>Open</u></pre>	✓ Cancel

GIVE THE CHECKS A NAME

Check Configuration Properties	Х
Check Configuration Create a new Check Configuration Create a new Check Configuration	CS
Type: External Configuration File Name: 401 A1	
Location: D:\UNCGoogleDrive\401-f15\Downloads\assignment1\unc_checks_401_f16_a1.xml Brow	/se
Description:	^
Advanced options Protect Checkstyle configuration file	
Additional properties OK Cancel	

NEW CONFIGURATION ADDED

•	Preferences	– 🗆 ×	
type filter text	Checkstyle	↓ ↓ ↓ ▼	
 General Ant Checkstyle Code Recomment Communications Help Install/Update Java 	General Settings Rebuild projects if needed: prompt Warn before losing configured file s Include rule names in violation mess Include module id (if available) in vio Limit Checkstyle markers per resource Run Checkstyle in background on fu	ets ages ? Iation messages ? re to 100 ? Il builds	
 Maven Mylyn ObjectAid PlantUML Plug-in Developm Run/Debug Team 	Global Check Configurations Check Configu Location Type 401 A1 D:\UNCG Extern Google Checks google_ch Built-In Sun Checks sun_check Built-In Sun Checks (sun_check Built-In UNIC Checks unc check Built-In	D Nev Th I C Config	ne file has been converted a form that Checkstyle can process
 WindowBuilder XML 	Description: Used in j	Set as Default	w we want to associate our
< > ?	OK	Expc Cancel	signment project with this configuration

EXAMINING PROJECT PROPERTIES

•				
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🛱 Package Explore 🗟	Build All	0	Ctrl+B	🕖 AnAb
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javareflects	Clean			
> JavaTeac 🗸	Build Automatical	lly		
⊳ 🔛 jung ⊳ 🔛 NIOTrickOr 🍭	Generate Javadoc.			Θ
▷ 2 > object-di ▷ 2 Record20se	Properties			Θ
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Select project properties

ASSIGN NEW CONFIGURATION

•	Properties for grail13	_ 🗆 🗙
type filter text	Checkstyle	← ← ⇒ ▼
 Resource Builders Checkstyle Java Build Path Java Code Style Java Compiler Java Editor Java Action Project References Refactoring Histor Run/Debug Settin Task Repository Task Tags Validation 	Main Local Check Configurations Checkstyle active for this project Write formatter/cleanup config (experimental!) Simple - use the following check configuration for all files 401 A1 - (Global) Description:	Use simple configuration
WikiText	Exclude from checking	Change
< >		
?	[OK Cancel

FOR EACH NEW ASSIGNMENT

• Download the checks file

- Create a new global configuration using the preferences command.
 - If the file changes (I post an update) the configuration does not have to be recreated, though you will need to replace the file and restart Eclipse.
- Associate the assignment project with the configuration using project properties.
- The checks file assumes modules in unc checks, so if you have not added the jar to the dropins (or plugins) folder, you will get an error. See next ppt.

ERROR WITH MISSING MODULES

If you were getting the following error, see next slides:



Slide by Kent Torell

CHECK IF UNC CHECKS ARE INSTALLED

First check in Window --> Preferences (or if on Mac Eclipse --> Preferences). Under the CheckStyles tab you should see UNC Checks as seen below:

pe filter text	Checkstyle					•
Colors and Fonts A Label Decorations Compare/Patch Content Types Editors Error Reporting	General Settings Rebuild projects if ne Warn before losing Include rule name	eded: prompt g configured file s in violation me	sets			Ry
Globalization Keys Network Connection Notifications Percentives	Include module id Limit Checkstyle in Run Checkstyle in Global Check Config	i (if available) in narkers per reso background on urations	violation messa urce to 100 full builds	ges (?)] (?)		
Search	Check Configura	Location	Туре	D	New	
 Security Startup and Shutdov 	A1 CheckFile	C:\Users\Ke google_che	External Co Built-In Co		Propertie	s
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User Storage Service Web Browser	Sun Checks (E	sun_checks unc_checks	Built-In Co Built-In Co		Copy	
> Workspace					Remov	e
Checkstyle Code Recommenders Help Install/Update Java					Set as Def	ault
Maven	Description:		Used in project	s:	_	
Mylyn Oomph PMD		^				
Run/Debug		\checkmark			Export.	

Slide by Kent Torell

Error Fix

If you don't see UNC CheckStyle you did not put the UNCChecks_6.5.0 in the dropins folder of your eclipse.

· 1	> Th	is PC → Desktop →	Extra 🖌 eclipse 🔅 dropi	ns	✓ ⁰	earch dropins 🛛 🔎
		Name		Date modified	Туре	Size
k access ;ktop	*	🛓 UNCChecks	_6.5.0	8/22/2017 1:12 PM	Executable Jar File	300 KB
cuments	*					
wnloads	*					
tures	*					
ecksFiles						
Make again.	sur	e that you pu	ut UNCChecks	in the correct	spot, restart	eclipse and

Slide by Kent Torell

CHECKSTYLE INSTALLATION AND USE INSTRUCTIONS

1. Install Checkstyle

2. Download Install Configuration Files

3. Invoke Checkstyle

If Checkstyle does not install, reverse 1 and 2 after uninstalling Checkstyle

CHECKING CODE WITH CHECKSTYLE

EXAMPLES PR	ADDITION TRADESTICAL		Close Unrelated Projects Assign Working Sets	
	Git Repositories & Git Repositories & Git Repositories & Codeanalyzer [master] - D:\de ColabTeaching [master] - D:\ Comp110-Grader - Copy [integration Comp110-Grader [integration DistributedReflection [master]		Debug As Run As Validate Compare With Replace With Restore from Local History	> > >
-	Configure project(s) from blueprint		Checkstyle	•
	Activate Checkstyle	P.	PMD	•
	Deactivate Checkstyle	(11)	Share With	•
_	Check Code with Checkstyle		Team	•
1	Clear Checkstyle violations		Configure	rc ∢
1	Create Formatter-Profile		Properties	Alt+Enter
		6	7	(3)

On each save, checkstyle can checks can be automatically done if checkstyle has been activated. However, UNC checks need to access multiple files, so do not activate checkstyle to avoid annoying messages

Instead, invoke Checks Code With Checkstyle when you want the whole project (rather than a single file) checked.

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CONSENT FORM

Explicitly checked unc checks are part of a research project and will work only if you agree to allow usage data to be gathered for research

← → C fi □ www	w.cs.unc.edu/~dewan/comp401/current/Downloads/Adult%20Consent%20Form.htm	숬 🔐 🛆 🖸 🗉
University of North Car Consent to Participate in Adult Participants Social Behavioral Form	olina-Chapel Hill a Research Study	
IRB Study 09-1134		
Consent Form Version L	ate: March 24, 2016	
Title of Study: Virtual R	Consent for Virtual Radical-Co-location and Beyond	
Principal Investigator: UNC-Chapel Hill Depa: UNC-Chapel Hill Phon Email Address: dewan@	I have the read the Adult Consent Form Dated March 24, 2016 for IRB STudy 09-1134. I agree to participate in the study. I agree to not modify or delete the collected data unless authorized by the study PI.	
Study Contact telephon		
Study Contact email: 🔗	lewan@cs.unc.edu	
What are some general to You are being asked to tak You may refuse to join, or Research studies are desig the research study. There a	hings you should know about research studies? e part in a research study. To join the study is voluntary. you may withdraw your consent to be in the study, for any reason, without penalty. ned to obtain new knowledge. This new information may help people in the future. A Vou may not receive any ilso may be risks to being in research studies.	direct benefit from being in
Details about this study ar research study.	e discussed below. It is important that you understand this information so that you can make an informed choice	about being in this
If you do no	t see the yes/no dialog, minimize other windows that may be covering it	2

CONSENT FORM AND LOG PER PROJECT



Per assignment log

Consent form

Will probably not look at data this semester

Need to give consent per project – files stored per project

CHECK STYLE VIOLATIONS IN WARNINGS WINDOW OF ECLIPSE

🔐 Problems 🔀 \mid @ Javadoc 🔞 Declaration 🛷 Search \, 📃 Console 🚳 Internal Web Browser

29 errors, 446 warnings, 0 others (Filter matched 129 of 475 items)

	-				
Description	Resource	Path	Location	Туре	^
a 🚯 Warnings (100 of 446 items)					
Comparing identical expressions	ABoolTypeDemoer.java	/JavaTeachingCheckStyl	line 5	Java Problem	
Comparing identical expressions	ABoolTypeDemoer.java	/JavaTeachingCheckStyl	line 10	Java Problem	
Comparing identical expressions	AnOperatorPrecedenceDemoer.java	/JavaTeachingCheckStyl	line 10	Java Problem	
🔈 Dead code	ABoolTypeDemoer.java	/JavaTeachingCheckStyl	line 17	Java Problem	
🔈 Dead code	ABoolTypeDemoer.java	/JavaTeachingCheckStyl	line 18	Java Problem	
💁 Dead code	ABoolTypeDemoer.iava	/JavaTeachingCheckStvl	line 19	Java Problem	

 ∇ \Box

CHECK STYLE VIOLATIONS IN ECLIPSE EDITOR WINDOW



BAD WARNINGS VS. GOOD INFO

This is bad, you did not define something we expect (shown in warnings section of "problems")

package main;

Multiple markers at this line

- expectedDeclaredSignatures: (Assignment1.java:3) In type Assignment1, missing declared signature: processInput:->void
- typeDefined: (Assignment1.java:3) Class/Interface Assignment1 matching tag main.Assignment(.*) defined

This is good, you defined something we expect (Shown in info section)

WARNING VS INFO SECTIONS Bad warning if you are implementing Problems 22 / Javadoc these extra credit Console 0 errors, 2 warnings, 2 others features Description Warnings (2 items) missingMethodCall: (Assignment1.java:1) has not made expected call (.*)!next:->String//EC missingMethodCall: (Assignment1.java:1) has not made expected call (.*)!hasNext:->boolean//EC i Infos (2 items) typeDefined: (Assignment1.java:5) Class/Interface Assignment1 matching tag main.Assignment(.*) defined i expectedTypes: Expected type names/tags [main.Assignment(.*), mp.scanner.ScanningIterator//EC] This is good info, This is pure info, //EC suffix means tells you one of the tells you what extra credit expected types has classes are being been found expected You should see such a message for each expected type

REMOVING UNC CHECKS

€	Properties for Test	- • ×
type filter text	Checkstyle	← → ⇒ →
▷ Resource Builders Checkstyle	Main Local Check Configurations Checkstyle active for this project	✓ Use simple configuration
Java Build Path > Java Code Style	Write formatter/cleanup config (experimental!)	
 Java Compiler Java Editor 	UNC Checks - (Global)	✓ Configure
Javadoc Location Project References Refactoring History Run/Debug Settings ▷ Task Repository Task Tags ▷ Validation WikiText	UNC configuration	
	Exclude from checking	Change
	Thes from packages:	

REMOVING CHECKSTYLE COMPLETELY

lefactor Navigate Search Project Run Window Help	r
δ 6 Welcome β +	,
3 7 Help Contents	
Search	
Dynamic Help	
Key Assist Ctrl+Shift+L	
Tips and Tricks	
Report Bug or Enhancement	
Cheat Sheets	
🍫 Perform Setup Tasks	
🍫 Check for Updates	
🖗 Install New Software	
Some Installation Details	
2 Eclipse Marketplace	
About Eclipse	
Description Resour	ce

REMOVING CHECKSTYLE COMPLETELY

Eclipse Installation	n Details	– 🗆 🗙
Installed Software Installation History Features Plug-ins Conf	guration	
type filter text		
Name	Version	Id
R Eclinse Checkstyle Plug_in	6 5 0 20150/121610	net of eclipsecs feature group
Eclipse Checkstyle Plug-III Eclipse IDE for Java Developers	4.5.0.20150621-1200	epp.package.java
<		>
This feature integrates Checkstyle 6 into the Eclipse environment.		^
		~
Update	iinstall I <u>r</u> oper	ties <u>C</u> lose

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ECLIPSE CHECKS

Checkstyle and UNC Checks

Built-in Eclipse Checks

Checkstyle augments Eclipse built in checks

ENABLING BUILT IN ECLIPSE CHECKS

Java - JavaTeachingCheckS File Edit Source Refactor Navigate Search Project Run Window He New Window 📑 - 🔛 🖻 🛆 🕸 🞯 -New Editor 🛱 Package Explorer 🖾 🍃 Type H eD Hide Toolbar ge **Open Perspective** B grail 13 - Copy cc Show View ⊿ 🔐 > JavaTeachingCheckStyle [J ub] ▷ 3 src Customize Perspective... JRE System Library [jdk1.7] Save Perspective As... Referenced Libraries Reset Perspective... 🛋 JUnit 4 **Close Perspective** 📄 checkstyle checkstyle (2).txt Close All Perspectives ub] checkstyle.txt Navigation ۲ 🔒 cloneFile Desktop.ini Preferences 🚮 dn.gif 14000

TWO IMPORTANT BUILT-IN CHECKS

•	Preferences	– 🗆 ×
type filter text	Errors/Warnings	⇔ • ⇒ • •
b General ▲	<u>Configure Projec</u>	t Specific Settings
Checkstyle	Select the severity level for the following optional problems:	
⊳ Help	type filter text (use ~ to filter on preference values, e.g. ~ignore or ~off)	
b Install/Update	Method can be static:	Ignore v ^
Appearance > Build Path	Method can potentially be static:	Ignore V
Code Style	<u>P</u> otential programming problems	
⊿ Compiler	 Name shadowing and conflicts 	
Building	Field declaration hides another field or variable:	Warning V
Errors/Warnings		Warning
Task Tags		warning *
Debug	Include constructor or setter method parameters	
b Editor	Type parameter hides another type:	Warning \vee
Installed JREs	Method does not override package visible method:	Warning 🗸
JUnit Droperties Files Edits	Interface method conflicts with protected 'Object' method:	Warning V
Maven	intendee menod connets with protected object menod.	wanning •
Plug-in Development	 Deprecated and restricted API 	
Run/Debug	Deprecated API:	Warning 🗸 🗸
⊳ Team 🗸	Restore Defaults	Apply
< >		,
?		Cancel
	These are done by the compiler, not	
	Chackstyle or UNCChacks	

CHECKSTYLE AND COMPILER CHECKS ARE INTEGRATED



🔐 Problems 🕱 🍬 Javadoc 🙉 Declaration 🛷 Search 📮 Console 🎱 Internal Web Browser

~ — E

29 errors, 446 warnings, 0 others (Filter matched 129 of 475 items)

Description		Resource	Path	Location	Туре	^
🐁 Resource leak: 's	canner' is never closed	AModularConsoleReadingUpperCasePr	/JavaTeachingCheckStyl	line 5	Java Problen	i i
🔈 Resource leak: 's	canner' is never closed	ScannerEchoer.java	/JavaTeachingCheckStyl	line 7	Java Problen	1
🔈 Resource leak: 's	canner' is never closed	ScannerUse.java	/JavaTeachingCheckStyl	line 5	Java Problen	1
🔈 Resource leak: 'te	extln' is never closed	APersistentPointHistory.java	/JavaTeachingCheckStyl	line 55	Java Problen	r i
A The argument of	type Component[] sł	ReflectingSwingComponentTreeMorp	/JavaTeachingCheckStyl	line 28	Java Problen	r
🐁 The enum const	ant NO_COMMAND r	AnUnmodularUndoableBMISpreadshee	/JavaTeachingCheckStyl	line 43	Java Problen	
🐁 The enum const	ant NO_COMMAND r	AnUnmodularUndoableBMISpreadshee	/JavaTeachingCheckStyl	line 56	Java Problen	i i
🐁 The field AMagn	ifiablePolarLine.initAr	AMagnifiablePolarLine.java	/grail13 - Copy/src/shap	line 13	Java Problen	i i
🐁 The field AnArra	yBasedScanner.MAX_	AnArrayBasedScanner.java	/grail13 - Copy/src/scan	line 95	Java Problen	
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