



## **DEBUGGING ANDROID APPLICATIONS**

- Some of the problems you may encounter while building android applications. The application may crash at runtime or not function as expected!
- As an IDE, Android Studio has some tools to help developers debug their code. These tools are:
  - The Logcat
  - Android Lint
  - The Debugger



#### THE LOGCAT

- When an **application is running**, the **Logcat tool window** provides access to **diagnostic messages**.
- The log output displays messages which are created using the Log class
  - The syntax to create a log diagnostic message is
     Log.[logLevelInitial]("TAG", "Message")
  - Some of the available log levels:
    - Information, Verbose, Debug, Error
  - the log level and the tag helps with **filtering messages**
  - Example: Log.d("PeekActivity", "Button Clicked!")

# THE LOGCAT



#### **ANDROID LINT**

- Android Lint is a static analyzer for Android code
  - a program that examines your code to find defects without running it
- Android Lint is aware of the Android framework components and and can find problems that the compiler cannot find.
- For example, it is good for finding issues in XML files.
- To run Android Lint: Code > Inspect Code the click Analyze

### **ANDROID LINT**

🐞 Android Studio File Edit View Navigate Cade Refactor Build Run Tools VCS Window Help 🛛 🗞 🛞 🔟 🔍 🕞 🗢 😭 🙄 O Thu 6:06 PM	
Rov Override Methods      OQuiz_Multiple_Screens.app.main]	
) app ) src ) main ) java ) edu ) utsa ) cs3443 ) rowdyquz implement Methods 🔿 🗠 🗛 epp 👻 🗋 piwitik API 33 👻 🕃 🔅 🕼 🗠 🕉 🔳 🦧 🛄 🔍 😡 😔	
k = An ③ 王 子 ☆ - 🚑 setivity_main.xml Collegate Methods Sank java × 💿 Peekketivity,jiva × 🕴 Device Manager 🌩 - 🔃	💿 🌑 🗧 Rowdy Quiz Multiple Screens – PeekActivity.java [Rowdy_Quiz_Multiple_Screens.app.main]
er v app 24 i v virtual Physical Virtual Physical	app) src ) main ) java ) edu ) utsa ) cs3443 ) rowdyouizmultiplescreens ) @ PeekActivity ) 📾 onClick 🛛 👟 🛋 app 👻 🗔 Pixel 6 API 33 👻 🚓 🚓 🗮 🚓 🖏 + 💑 🔳 🚓 🗋 🔍 🗛
g v intelliests code compared i v code code code compared i v code code code code code code code code	
v Di eduutsa.cs3443.row 27 ef publ. Inspeci Code Derice ▲	🙀 🛎 An 😳 🚊 🛧 🐺 — 🚔 activity_main.xml × 🚔 activity_peek.xml × 💿 MainActivity.java × 💿 QuizBank.java × 💿 PeekActivity.java × 🕴 Device Manager 🛛 🐺 —
Constinue of the second data second d	🖁 🗸 🐂 app 23 button.setOnClickListener(this); 🗸 Virtual Physical
C QuizBank 30     Analyze Stack Trace or Thread Dump     Shown, onswer);     U +0 +0 □ 10 C - 4 ● ■ 00 >> 7	x > ■ manifests 24 }
g Contractivity 31 Insert Live Tempiste 3f J	čreate Device S ?
> Savo as Livo Templato	ĝ ∨ 🖿 edu.utsa.cs3443.row 26 @Overnide
> Direduutse.cs3443.row 33 P Surround With	🔹 🕆 🖿 model 22 eft a public void opClick (View view) {
trs jøvå (generated) Unwrap/Remove ◇ # ▷	© Question
Logeat × + Folding > T - F	G QuizBank 20 Lug. U (ag. PeerActivity, mag. Botton Cticked: ), () () () () () () () () () () () () ()
Pixel 6 API 33 (emulator-5554) Android 13, API 33 Comment with Line Comment 34 /	<sup>®</sup> MainActivity <sup>29</sup> <sup>29</sup> String answer = getIntent().getStringExtra( name: "answer");
Comment with Block Comment TT# /	C PeekActivity 30 TextView answerTextView = findViewById(R.id.shown_answer);
2023-09-28 18:05:01.022 0.05-860 01 0 Scan Pesult ready event	> Imedu.utsa.cs3443.row(31 answerTextView.setText(answer);
C 2823-09-28 18:05:11.395 393-393 an Auto-indent Lines	> 🛅 edu.utsa.cs3443.row( 32 🍦 }
2023-09-28 18:05:15.725 4946-4967 EG	The java (generated) 33
the set of th	V assets
2023-09-28 13:05:54,490 4946-4946 CL Move Statement Up 0:3% I Clapbaard overlay suppressed.	e questions.csv 😑 💼 11
= 5 2823-89-28 18:86:80.887 635-4772 Ac Maye Element Right ℃0.8 W Unable to start service Intent { act=android.servi	✓ res
g 🚍 2823-89-28 18:86:80.887 435-4772 Rc Move Line Down 😯 W could not bind to Intent { act=android.service.sma	2 × 🖿 drawable
t 2823-89-28 18:86:00.007 635-635 Ac Move Line Up 🔨 🐼 ▲ 🗰 Unbind failed: could not find connection for andro	E duncher backg
D app_time_stats: avg=44385.92ms min=44385.92ms max=	🕈 Problems: File Project Errors 'Project Default' Profile on Project 'Rowdy Quiz Multiple Scree 🗴 🏚 —
p Version Control 🔈 Run 🖉 Profiler 🖻 Logost 🖏 Katate selections backwards 🔯 Terminal 🔘 Services 🔮 App Inspection 🗠 Layout Inspector	a v ren V Inspection Desults 10 errors 40 warnings 41 turos
🚺 Install successfully finished in 1 s 814 ms. (13 minutes ago) 28:30 L.F. UTF-8. 4 spaces 🦕 😫	Android Lint: Accessibility 2 warnings     Select inspection to see problems.     Select inspection to see problems.
Rowdy Quiz Multiple Screens – PeekActivity.java [Rowdy Quiz Multiple Screens.app.main]	2 Z M > Android Link Recession & Francisco Section 2 Francisco Sec
	E → Individ Lint: Berformance 4 warnings
	a b Android Lint Februario 4 warmings
e v la app 24 j	
a > ■ manifests 25	
s v java 20 (0Verhide officiel officiel) (View View) {	Centrel at twaning
à → Dimodel 28 Log.d(ing: "PeekActivity", mig: "Button Clicked!"); Bunchan Daviese _ Divol F □ → -	a ) by a 12 wardings
© Question 29 String answer = getIntent().getStringExtra( name: "answer");	2 Java is warmings
Courbank 30 TextView answerTextView = findViewById(R.id.shown_answer);     Courbank 30 TextView answerTextView = findViewById(R.id.shown_answer);	a Provincearing 41 (pb/s
C PeekActivity	A ANIL 2 warnings
b edu utsa.cs3443.row 33 } Inspection Scope	🖞 Version Control 🕨 Run 🗥 Profiler 📰 Lagcat 🖤 App quality registrics 🔨 Build 🗮 T0000 🚯 Problems 🗵 Terminal 🚯 Services 🔮 App Inspection 🖾 Layout Inspector
Rivra (generated) O Whole project	🗆 Install successfully finished in 1 s 814 ms. (14 minutes ago) V 28:50 LF UTF-8 4 spaces 🦕 I
Logcat: Logcat × + O Custom scope: All Places v	
Pixel 6 API 33 (emulator-5554) Android 13, API 33	
2823-89-28 18:05:01.022 635-865 WifiNi Inspection profile: Project Default Project Configure n result ready event	
a 1 2023-09-28 18:05:01.022 635-865 Wifine 2 Cancel Apply n result ready event	
C 2823-89-28 18:5:11.395 393-393 anoro con android extensi 0 and the state source source and the state source sour	
2023-09-28 18:05:54.915 635-847 androidtc system_process 0 Initializing SystemExtClassifier, type = System	
2023-09-28 18:05:54.940 4946-4946 ClipboardListener com.android.systemui I Clipboard overlay suppressed.	
2023-09-28 18:05:55.143 4946-4946 ClipboardListener com.android.systemui I Clipboard overlay suppressed.	
2823-89-28 18:06:00.007 635-4772 ActualtyRanager system_process W Unable to start service Intent { act=android.servig	
223-09-28 18:06:00.007 635-635 ActivityManager system.process W Unbind failed: could not find connection for androa	
2823-89-28 18:86:80.831 4946-4967 EGL_emulation com.android.systemui 0 app_time_stats: avg=44305.92ms min=44305.92ms max	
a >	
P Version Control № Run //2 Politier 🐷 Logical 🍄 App Quality Insights 🔨 Build 🚍 TODO 🕹 Problems 🗷 Terminal 🗿 Services 🔮 App Inspection 🔍 Logical Logical Politics Control № Run //2 Politics Control № R	

#### THE DEBUGGER

- The debugger is a tool mainly used to run the application under controlled conditions that permit the developer to track its execution and monitor changes in computer resources that may indicate malfunctioning code.
- To control the application execution, add breakpoints to your code lines.
- A breakpoint next to a line of code pauses the execution before the line executes and allows you to examine what happens next.
- To run the application in debug-mode, add breakpoint(s) then
   Run > Debug

#### THE DEBUGGER

- When using the debugger, the developer can control the app execution:
  - Step Into
    - A method is about to be invoked, and you want to debug into the code of that method, so the next step is to go into that method and continue debugging step-by-step.
  - Step Over
    - A method is about to be invoked, but you're not interested in debugging this particular invocation, so you want the debugger to execute that method completely as one entire step.
  - Step Return
    - You're done debugging this method step-by-step, and you just want the debugger to run the entire method until it returns as one entire step.
  - Resume
    - You want the debugger to resume "normal" execution instead of step-by-step

# THE DEBUGGER



### **DEBUGGING ANDROID APPLICATIONS**

- When errors persist, some things you can try
  - Recheck the xml in resource files
  - Clean the project build
    - Build > Clean Project
    - Android studio will rebuild the project from scratch
  - Clean the project
    - File > Invalidate Caches/Restart
    - Android Studio will perform some maintenance on the project and restart itself
  - Check online :)



