

# PROGRAMMING HANDHELD SYSTEMS

ADAM PORTER

# THE FRAGMENT CLASS

# TABLET UIs

TABLETS HAVE LARGER DISPLAYS THAN  
PHONES DO

THEY CAN SUPPORT MULTIPLE UI PANES /  
USER BEHAVIORS AT THE SAME TIME

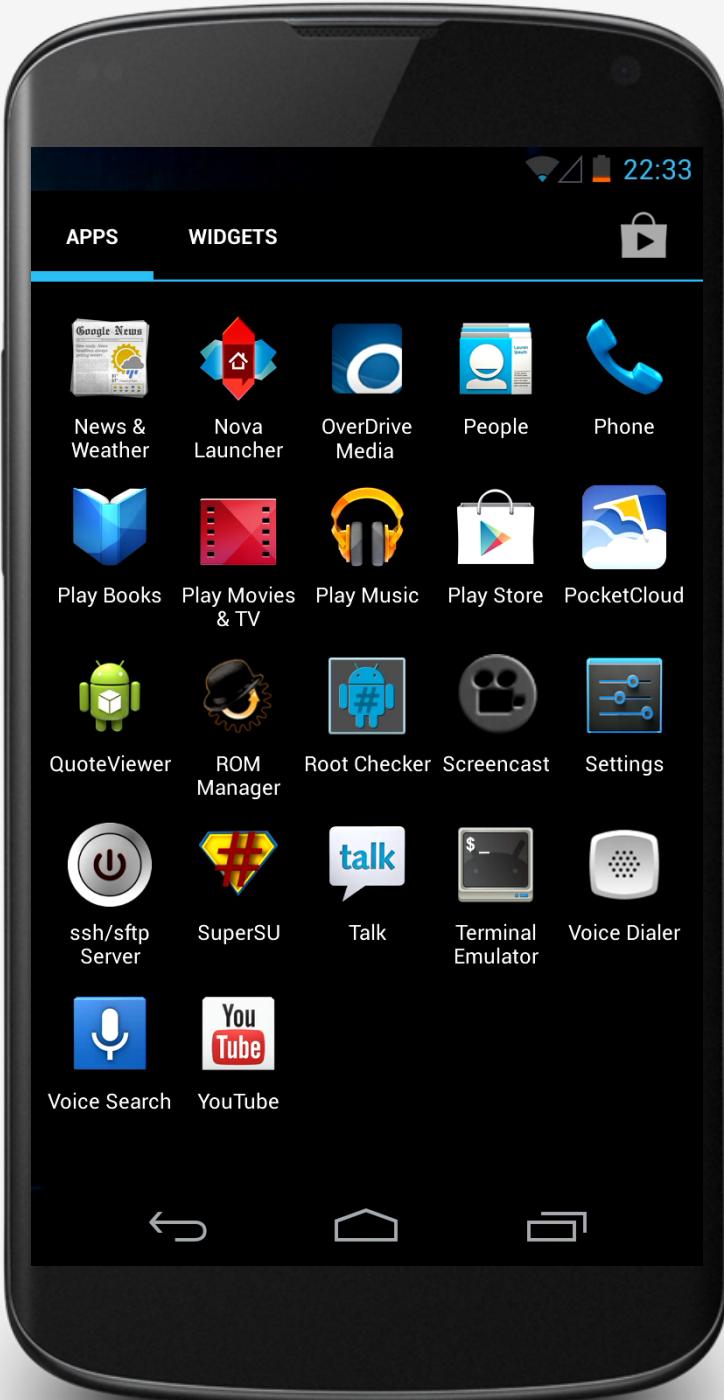
THE 1 ACTIVITY – 1 THING THE USER CAN DO  
HEURISTIC MAY NOT WORK FOR LARGER DEVICES

# QUOTEVIEWER

APPLICATION USES TWO ACTIVITIES

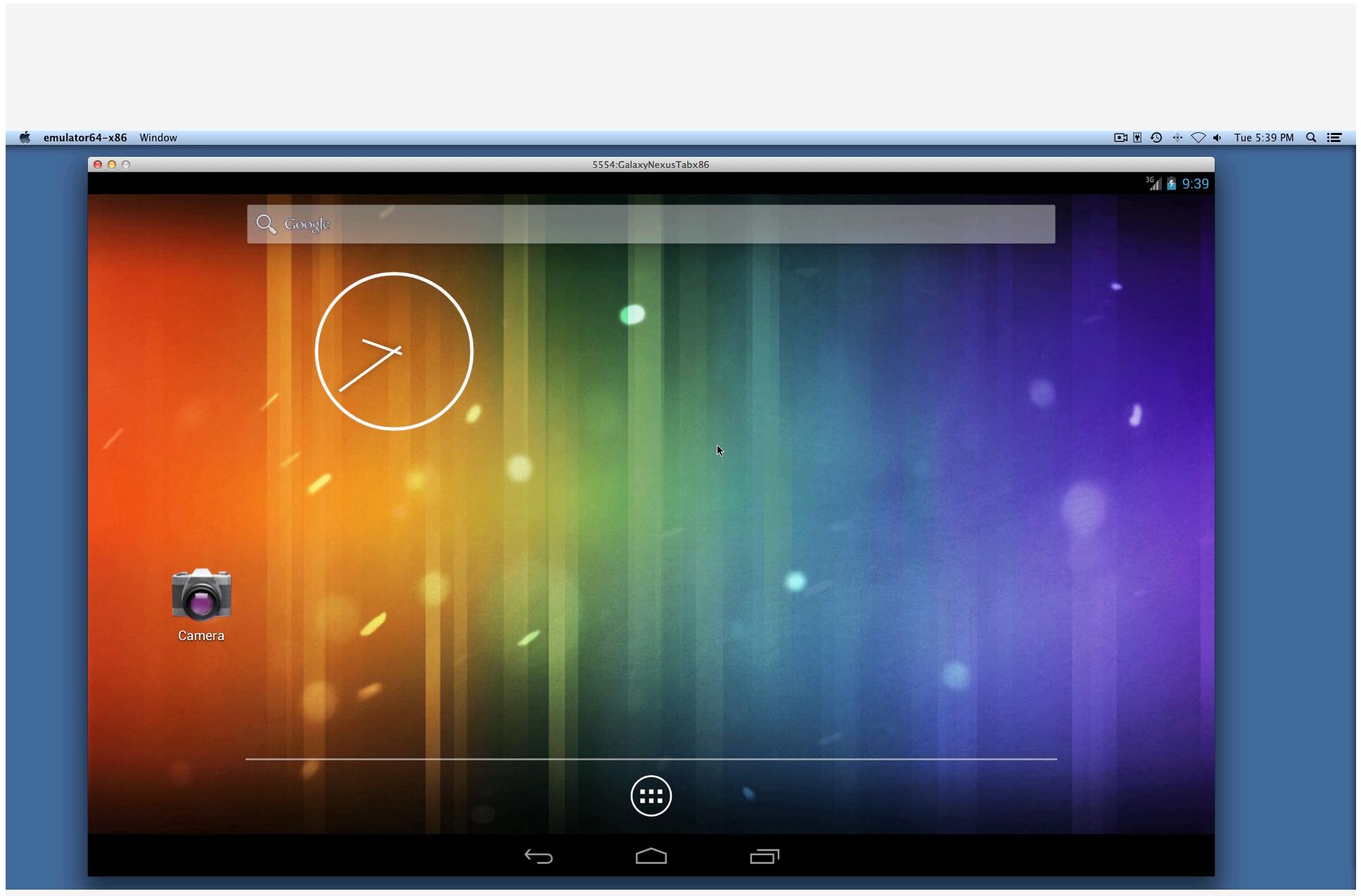
ONES SHOWS TITLES OF SHAKESPEARE PLAYS &  
ALLOWS USER TO SELECT ONE TITLE

THE OTHER SHOWS A QUOTE FROM SELECTED PLAY



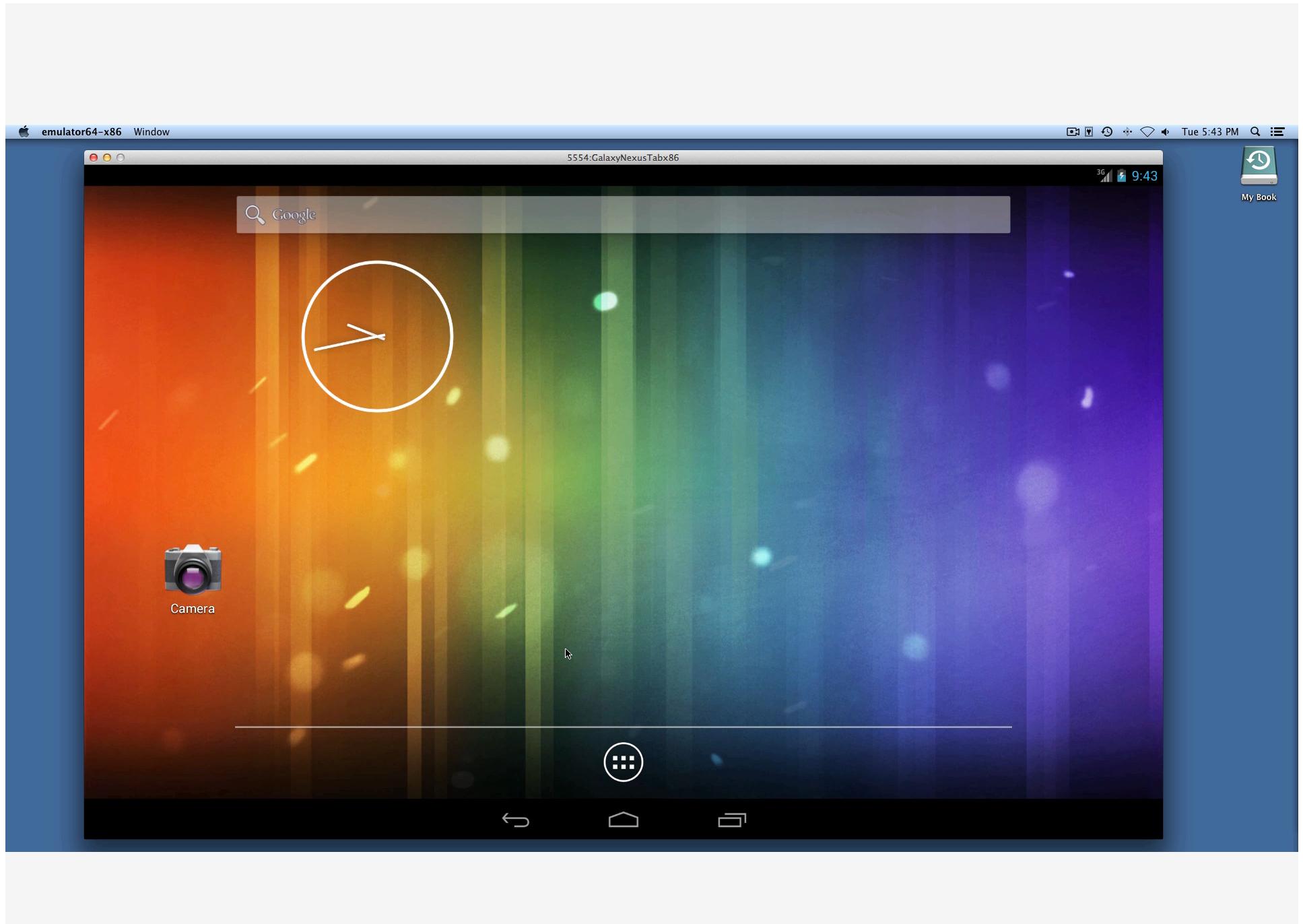
# THE QUOTEVIEWER UI

THIS LAYOUT IS REASONABLE ON A PHONE  
BUT INEFFICIENT ON A LARGER DEVICE



# BETTER LAYOUT

USE TWO COOPERATING LAYOUT UNITS ON ONE SCREEN



# FRAGMENT

REPRESENTS A BEHAVIOR / PORTION OF UI  
WITHIN AN ACTIVITY

MULTIPLE FRAGMENTS CAN BE EMBEDDED IN  
AN ACTIVITY TO CREATE A MULTI-PANE UI

A SINGLE FRAGMENT CAN BE REUSED ACROSS  
MULTIPLE ACTIVITIES

# FRAGMENT LIFECYCLE

FRAGMENT LIFECYCLE IS COORDINATED WITH  
THE LIFECYCLE OF ITS CONTAINING ACTIVITY

FRAGMENTS HAVE THEIR OWN LIFECYCLES  
AND RECEIVE THEIR OWN CALLBACKS

# FRAGMENT LIFECYCLE STATES

RESUMED

FRAGMENT IS VISIBLE IN THE RUNNING ACTIVITY

PAUSED

ANOTHER ACTIVITY IS IN THE FOREGROUND AND  
HAS FOCUS, CONTAINING ACTIVITY IS VISIBLE

STOPPED

THE FRAGMENT IS NOT VISIBLE

# LIFECYCLE CALLBACK METHODS

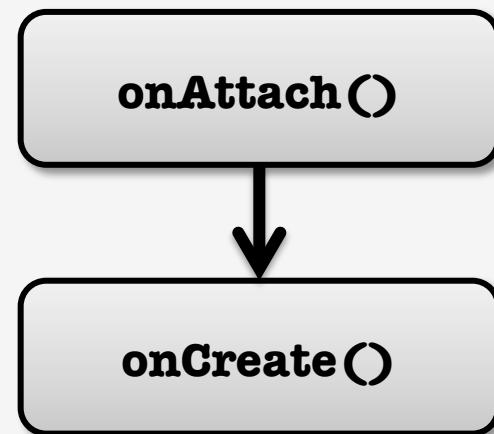
# ACTIVITY CREATED: ONATTACH()

FRAGMENT IS FIRST  
ATTACHED TO ITS  
ACTIVITY

**onAttach()**

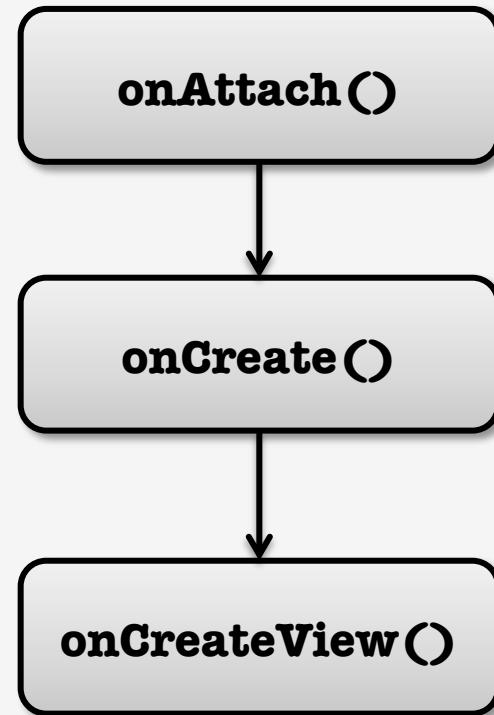
# ONCREATE()

INITIALIZE THE  
FRAGMENT



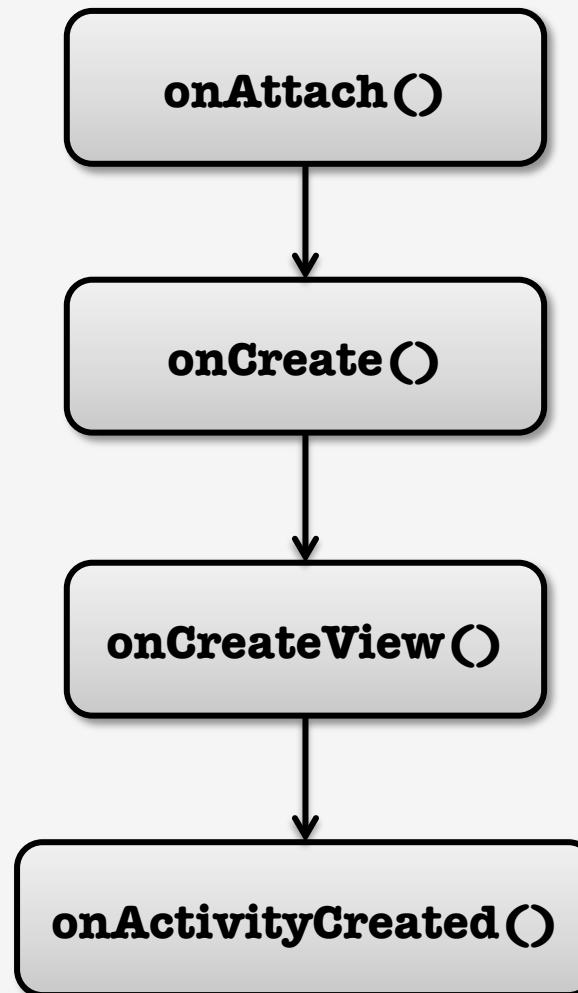
# ONCREATEVIEW()

FRAGMENT SETS UP &  
RETURNS ITS USER  
INTERFACE



# ONACTIVITYCREATED()

CONTAINING ACTIVITY  
HAS COMPLETED  
`onCreate()` AND THE  
FRAGMENT HAS BEEN  
INSTALLED



# ACTIVITY STARTED: ONSTART()

HOSTING ACTIVITY  
ABOUT TO BECOME  
VISIBLE

`onStart ()`

# ACTIVITY RESUMED: ONRESUME()

HOSTING ACTIVITY IS  
ABOUT TO BECOME  
VISIBLE AND READY  
FOR USER INTERACTION

`onResume()`

# ACTIVITY PAUSED: ONPAUSE()

HOSTING ACTIVITY IS  
VISIBLE, BUT DOES NOT  
HAVE FOCUS

`onPause()`

# ACTIVITY STOPPED: ONSTOP()

HOSTING ACTIVITY IS  
NO LONGER VISIBLE

`onStop ()`

# ACTIVITY DESTROYED: ONDESTROYVIEW()

VIEW PREVIOUSLY  
CREATED BY  
ONCREATEVIEW() HAS  
BEEN DETACHED FROM  
THE ACTIVITY

`onDestroyView()`

Typical Actions

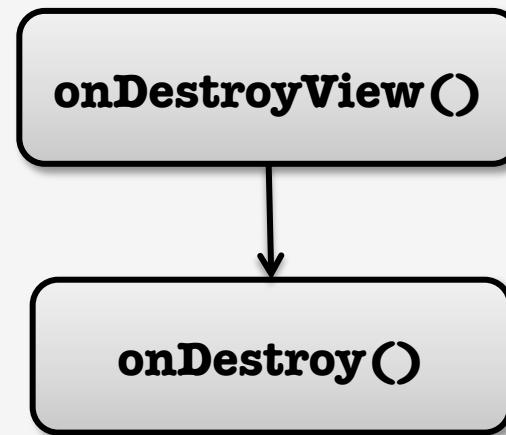
CLEAN UP VIEW  
RESOURCES

# ONDESTROY()

FRAGMENT IS NO  
LONGER IN USE

TYPICAL ACTIONS

CLEAN UP FRAGMENT  
RESOURCES

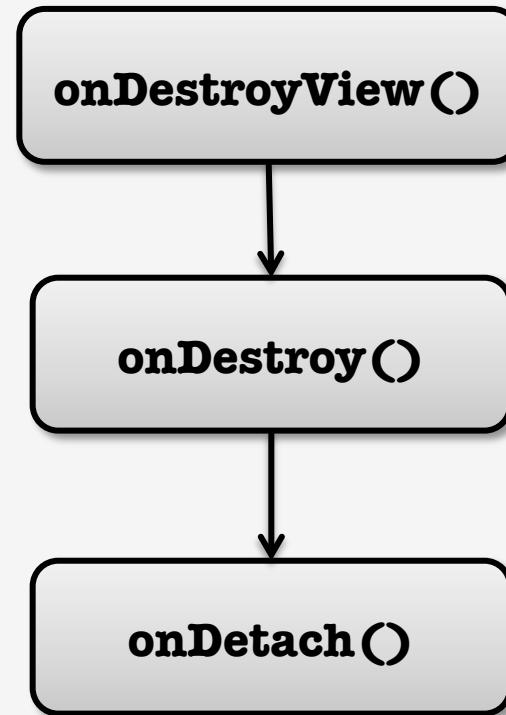


# ONDETACH()

FRAGMENT NO LONGER  
ATTACHED TO ITS  
ACTIVITY

TYPICAL ACTIONS

NULL OUT REFERENCES  
TO HOSTING ACTIVITY



# ADDING FRAGMENTS TO ACTIVITIES

TWO GENERAL WAYS TO ADD FRAGMENTS TO AN ACTIVITY'S LAYOUT

DECLARE IT STATICALLY IN THE ACTIVITY'S LAYOUT FILE

ADD IT PROGRAMMATICALLY USING THE FRAGMENTMANAGER

# FRAGMENT LAYOUT

LAYOUT CAN BE INFLATED/IMPLEMENTED IN  
ONCREATEVIEW()

ONCREATEVIEW() MUST RETURN THE VIEW AT  
THE ROOT OF THE FRAGMENT'S LAYOUT

THIS VIEW IS ADDED TO THE CONTAINING  
ACTIVITY

3G  5:18



FragmentStaticLayout

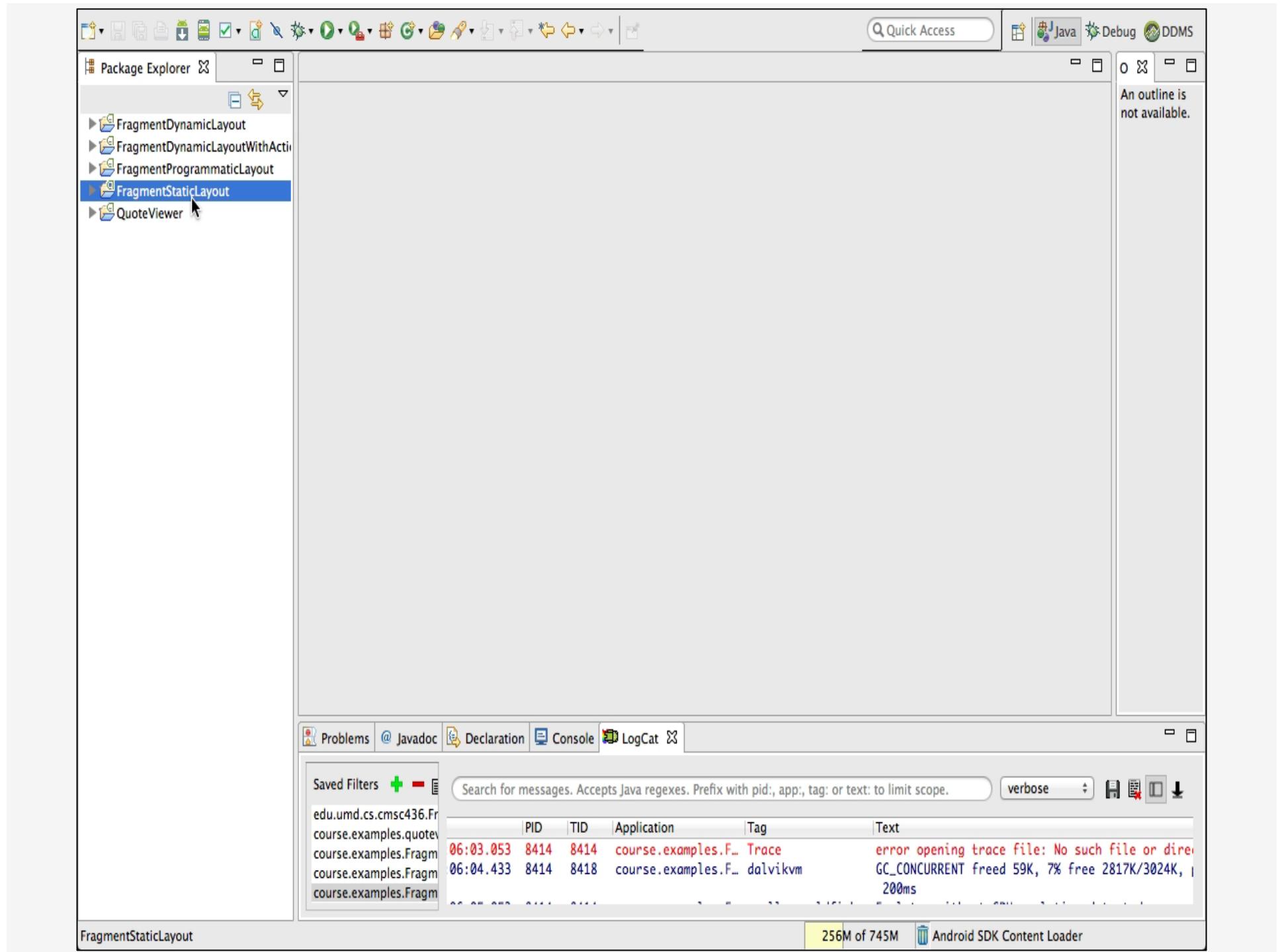
Hamlet

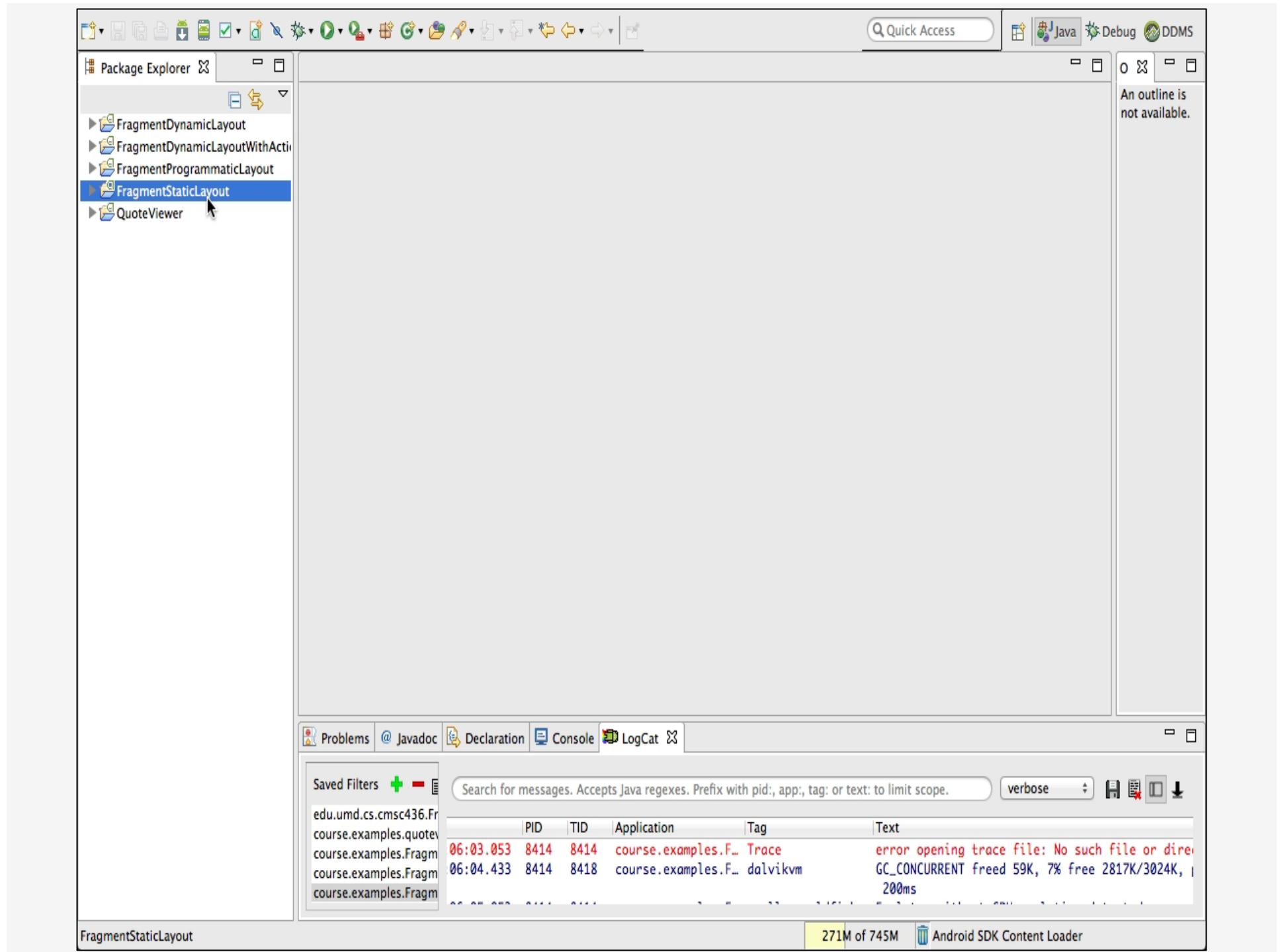
King Lear

Julius Ceasar

Now cracks a noble heart. Good-night, sweet prince; And flights of angels sing thee to thy rest.







# ADDING FRAGMENTS DYNAMICALLY

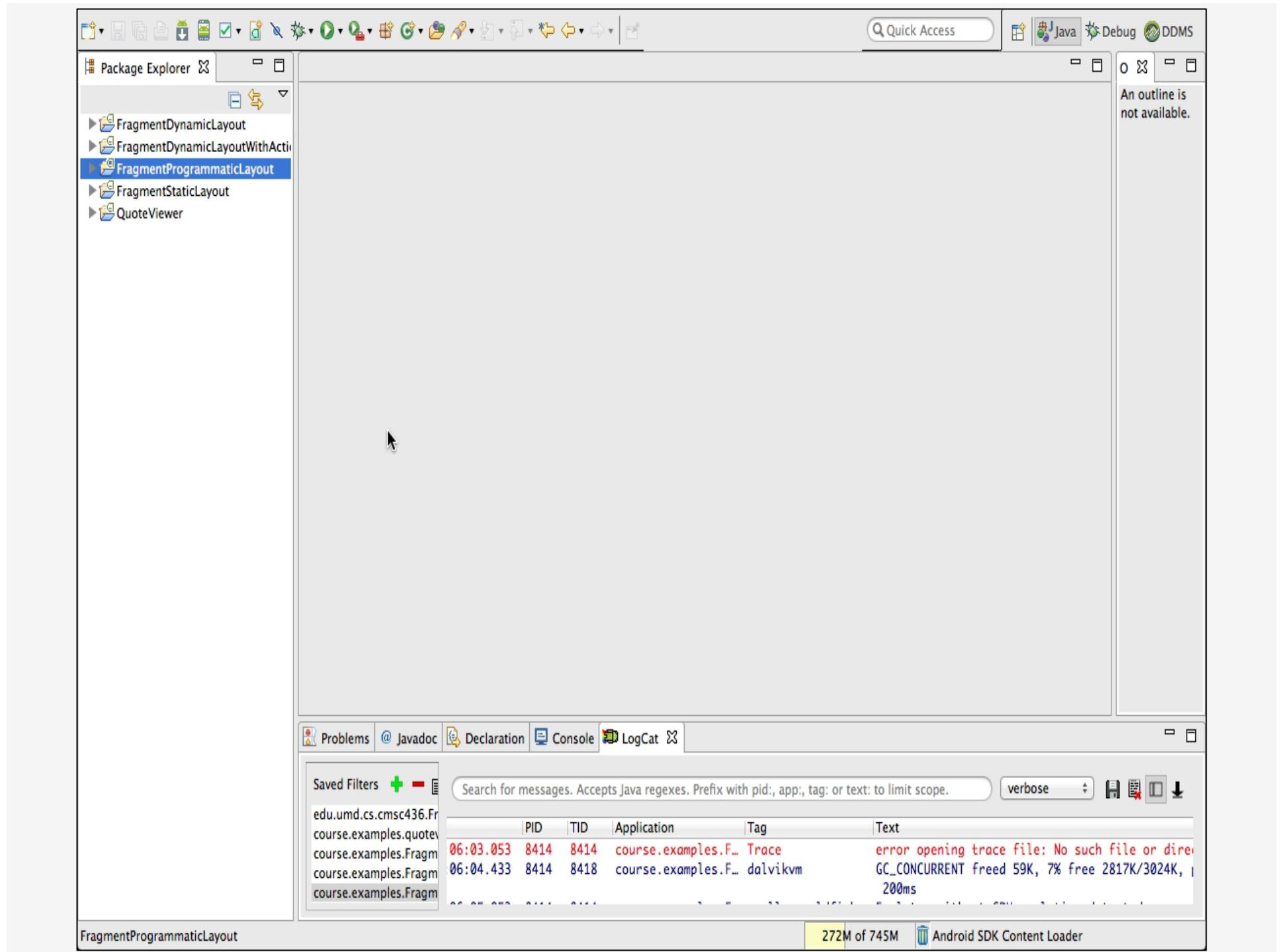
WHILE AN ACTIVITY'S RUNNING YOU CAN ADD A  
FRAGMENT TO IT'S LAYOUT

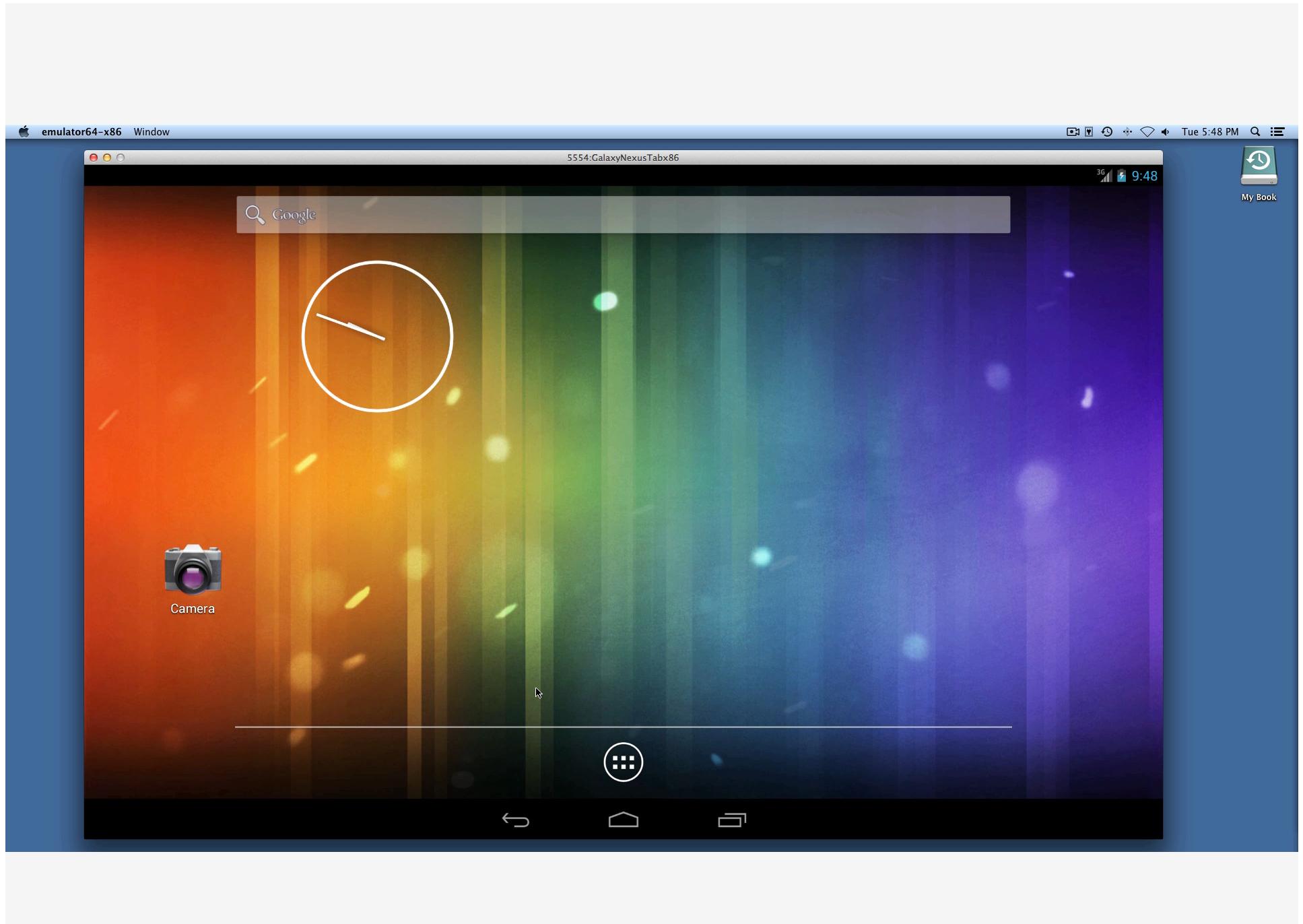
GET REFERENCE TO THE FRAGMENTMANAGER

BEGIN A FRAGMENTTRANSACTION

ADD THE FRAGMENT

COMMIT THE FRAGMENTTRANSACTION

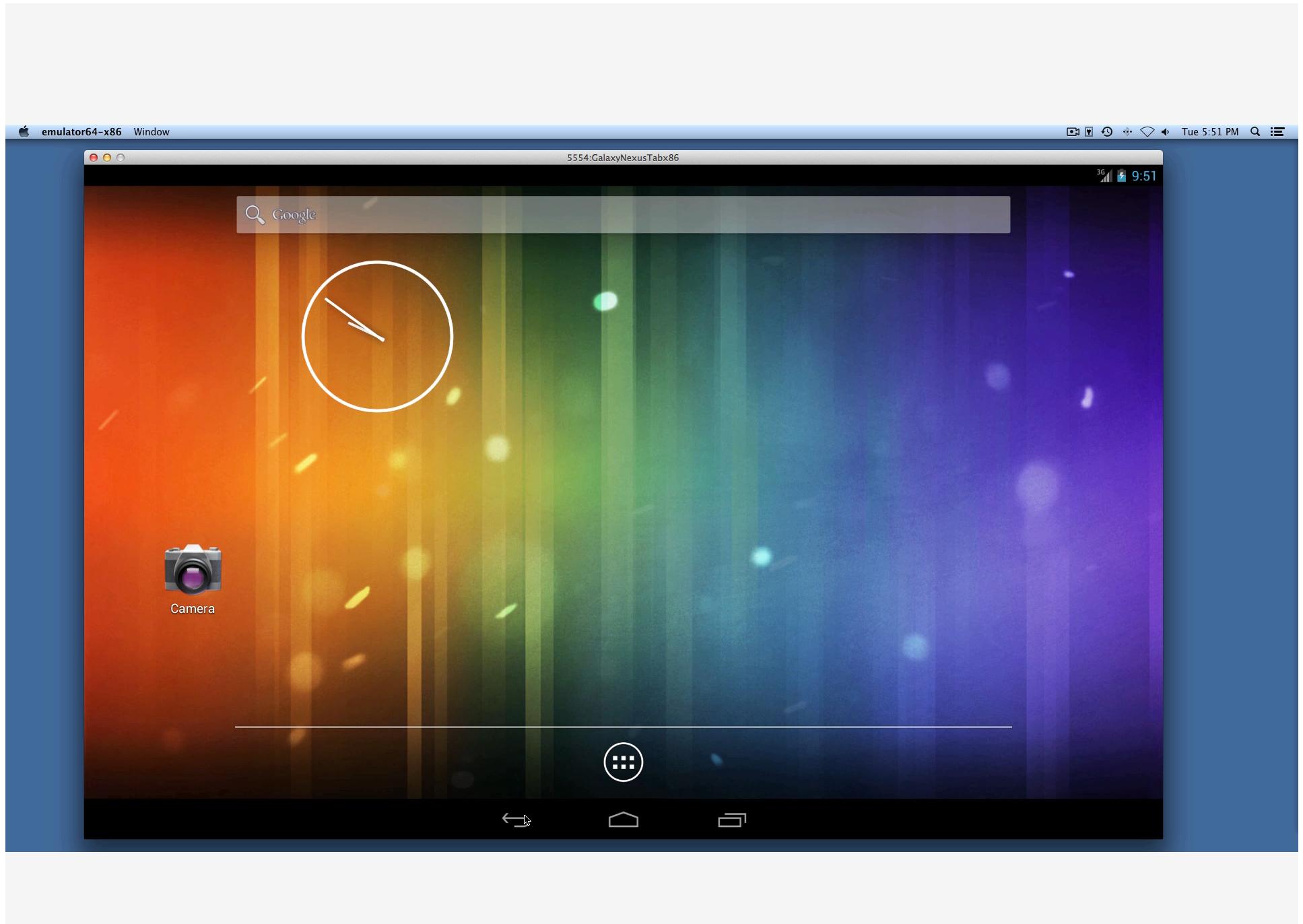


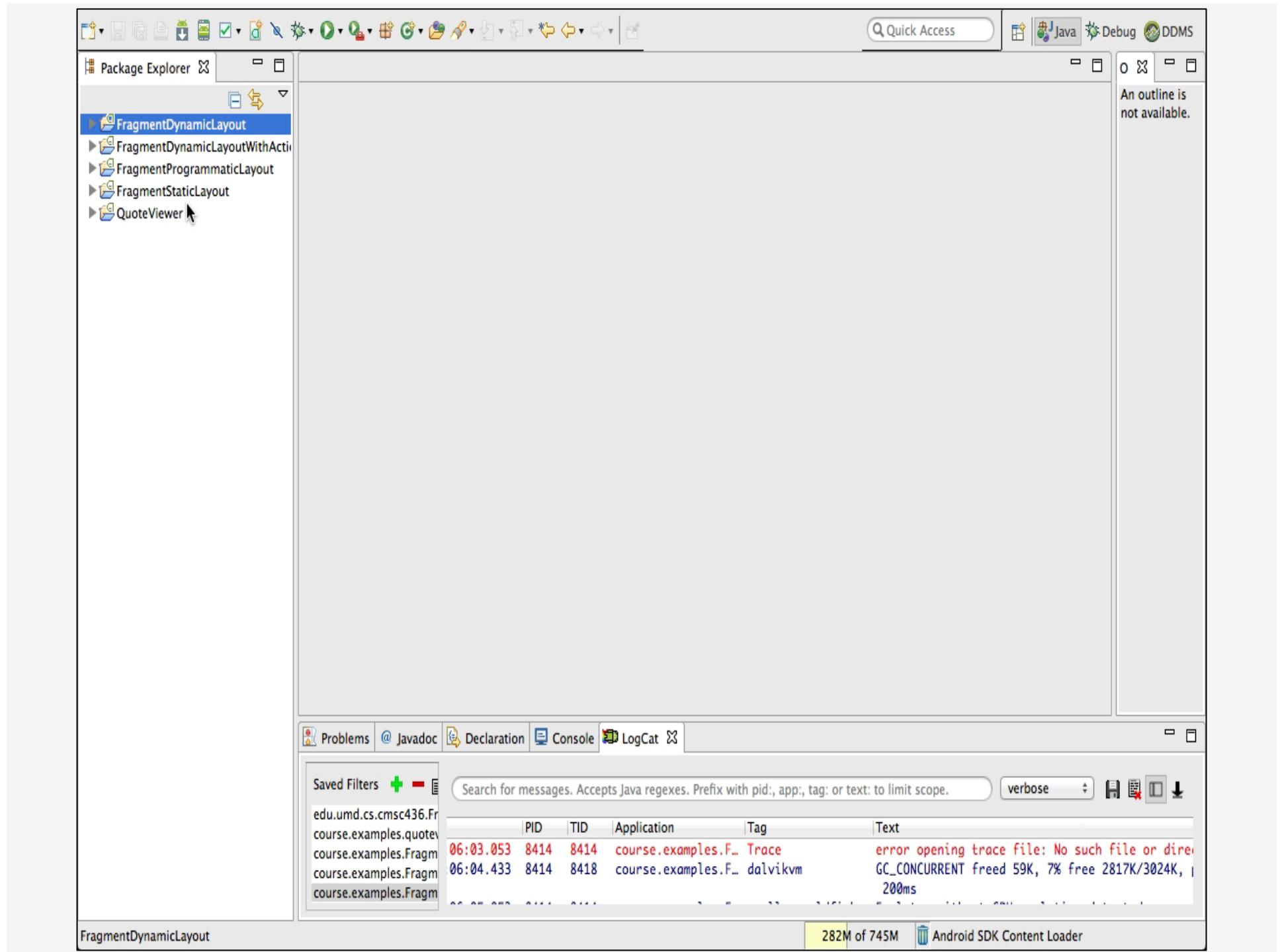


# DYNAMIC LAYOUT

FRAGMENT TRANSACTIONS ALLOW YOU TO DYNAMICALLY CHANGE YOUR APP'S USER INTERFACE

CAN MAKE THE INTERFACE MORE FLUID & TAKE BETTER ADVANTAGE OF AVAILABLE SCREEN SPACE





# CONFIGURATION CHANGES

IF YOU CALL `setRetainInstance(true)`,  
ANDROID WON'T DESTROY THE FRAGMENT ON  
CONFIGURATION CHANGES

# CONFIGURATION CHANGES

RESULTS IN SOME CHANGES TO LIFECYCLE  
CALLBACK SEQUENCE

`onDestroy()` WILL NOT BE CALLED

`onCreate()` WILL NOT BE CALLED

# FRAGMENTSTATICCONFIGLAYOUT

FUNCTIONALITY IS SIMILAR TO PREVIOUS EXAMPLES

FRAGMENTSTATICCONFIGLAYOUT

IN LANDSCAPE MODE

BOTH FRAGMENTS USE A LARGE FONT

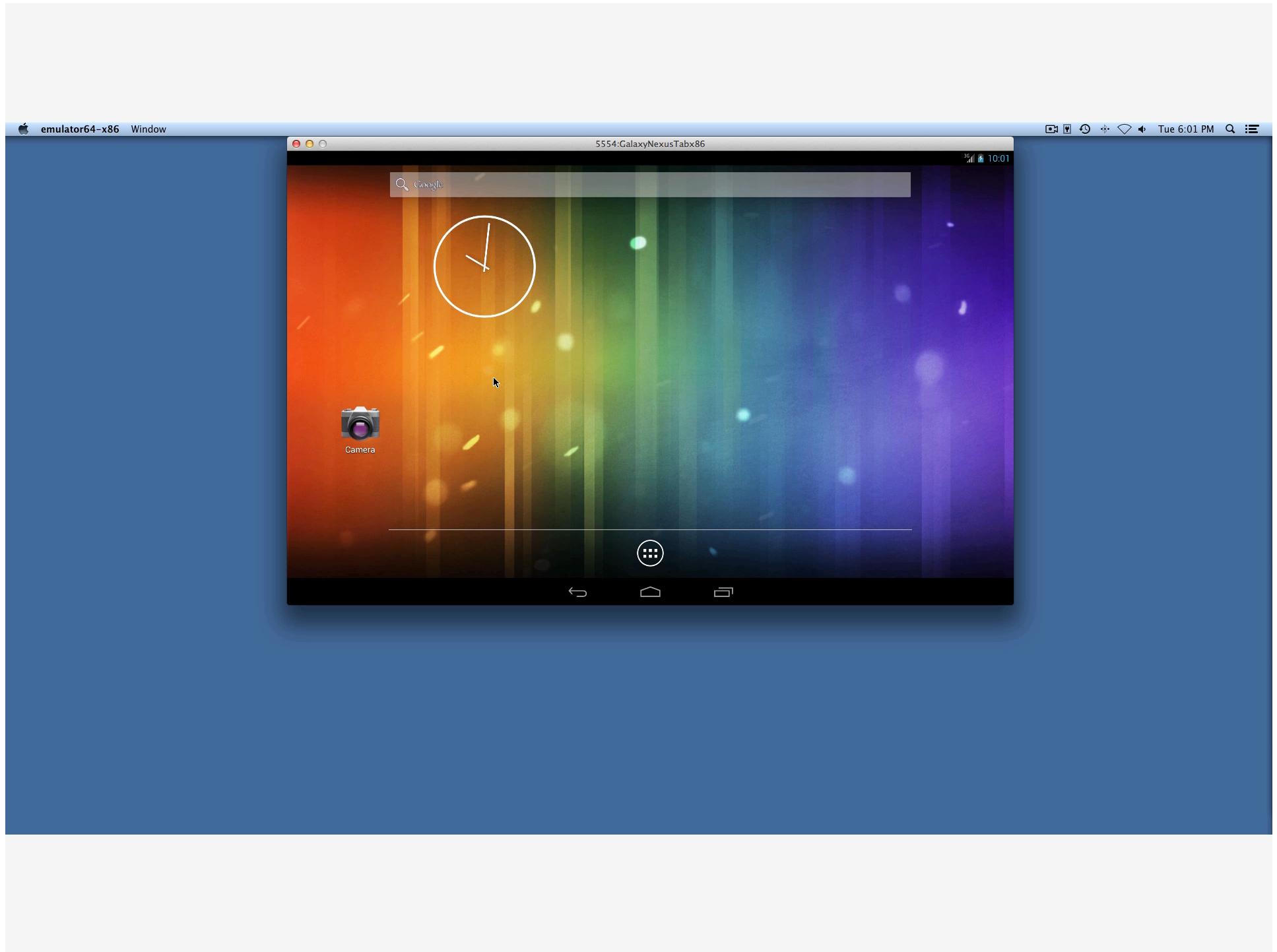
TITLEFRAGMENT TAKES MORE HORIZONTAL  
SPACE & ALLOWS LONG TITLES TO SPAN  
MULTIPLE LINES

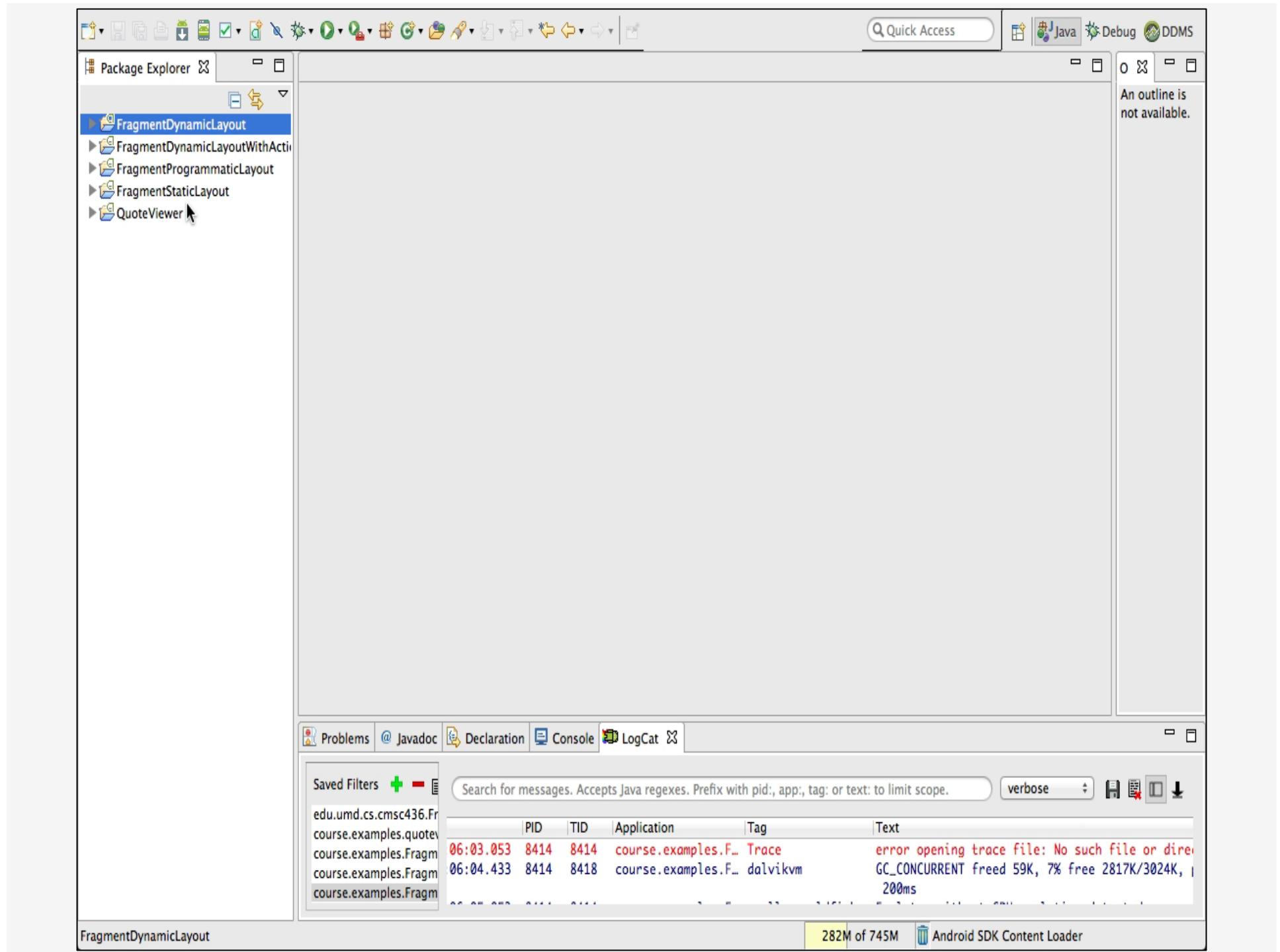
# FRAGMENTSTATICCONFIGLAYOUT

IN PORTRAIT MODE

BOTH FRAGMENTS USE A SMALLER FONT

TITLEFRAGMENT WILL USE LESS SPACE AND  
WILL ELLIPSIZE LONG TITLES, LIMITING THEM TO  
A SINGLE LINE





NEXT TIME

USER INTERFACE CLASSES