COMP08076
Programming Native App Interaction

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- Lecture 7
  - Part 2 of module - games
  - Views
  - Motion events

View Class – from lecture 3

- This class represents the basic building block for user interface components. A View occupies a rectangular area on the screen and is responsible for drawing and event handling. View is the base class for *widgets*, which are used to create interactive UI components (buttons, text fields, etc.).
- http://developer.android.com/reference/android/view/View.html

- Extends object

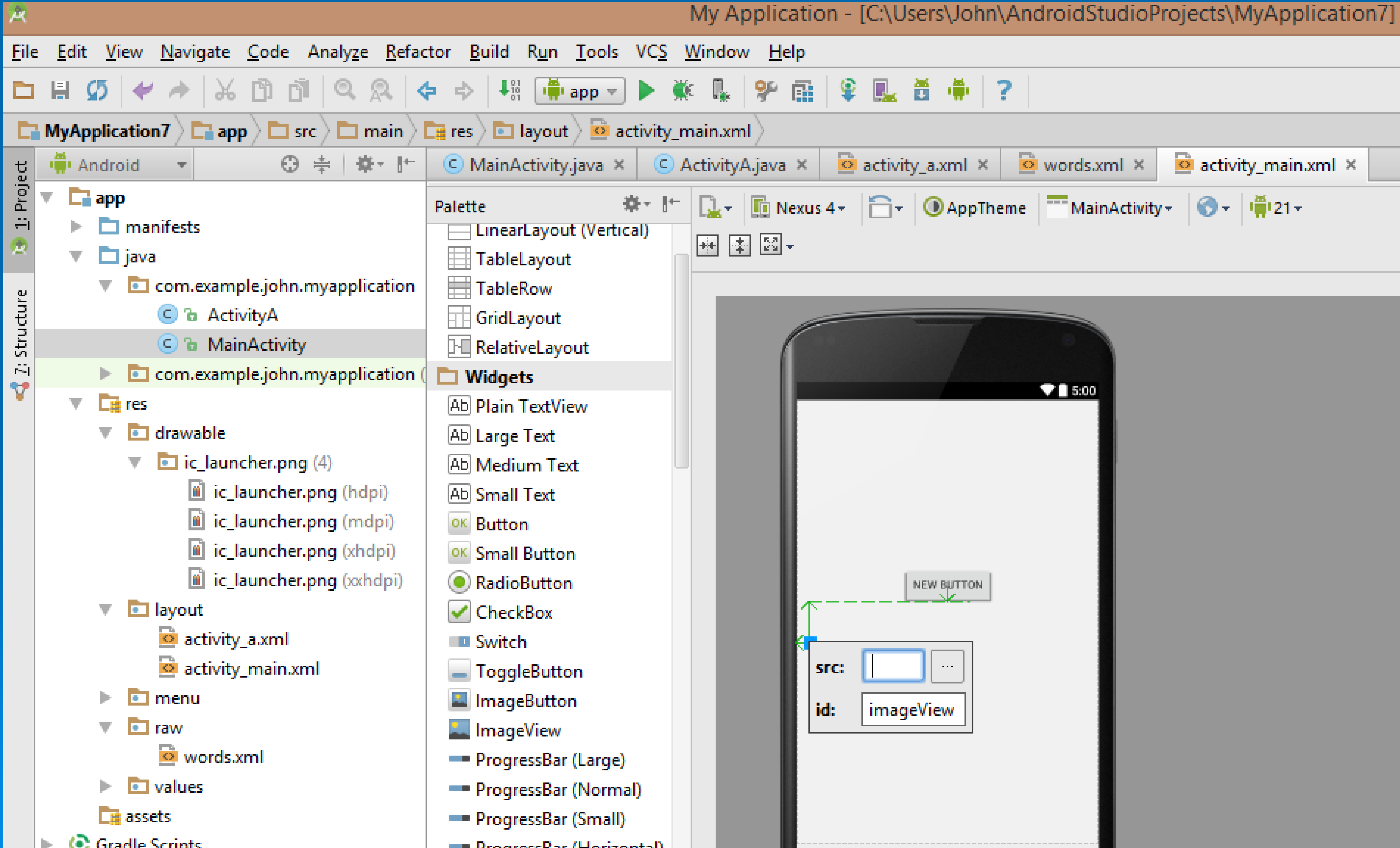
- Has subclasses
  - ImageView
  - SurfaceView
  - TextView
  - Etc.

- ImageView has subclass ImageButton
- TextView has subclasses Button, EditText etc
- Button has subclasses CheckBox, RadioButton etc

Where we have used Views before

- TextView
  - A widget
- setContentView(R.layout.activity_main);
  - View from a layout file
- View from a widget (week 1)
  - Button button;
  - button = new Button(this);
  - setContentView(button);
- In interfaces
  - implements View.OnClickListener
  - public void onClick(View view)
-

ImageView



src:

id: imageView

Resources res/

http://developer.android.com/guide/topics/resources/overview.html

- Resources
  - res/ and subfolders
  - “Externalise” resources (images, strings) from code
  - Default and alternative (Layout, internationalisation…)
  - Must be placed in the right location. For example bitmap files must live in res/drawable .
  - Android automatically generates an R.java which contains fields whose names correspond to the resources found in res.
  - Are compressed, except for resources in res/raw

res/drawable

- A drawable resource is a general concept for a graphic that can be drawn to the screen
- We are interested in bitmap images
  - .png (preferred), .jpg (acceptable), .gif (discouraged)
- Must be in res/drawable folder
- Copy, select drawable folder in project and paste

- ImageView
- <ImageView

```
    android:layout_height="wrap_content"
    android:layout_width="wrap_content"
    android:src="@drawable/myimage" />
```

Constructor Methods

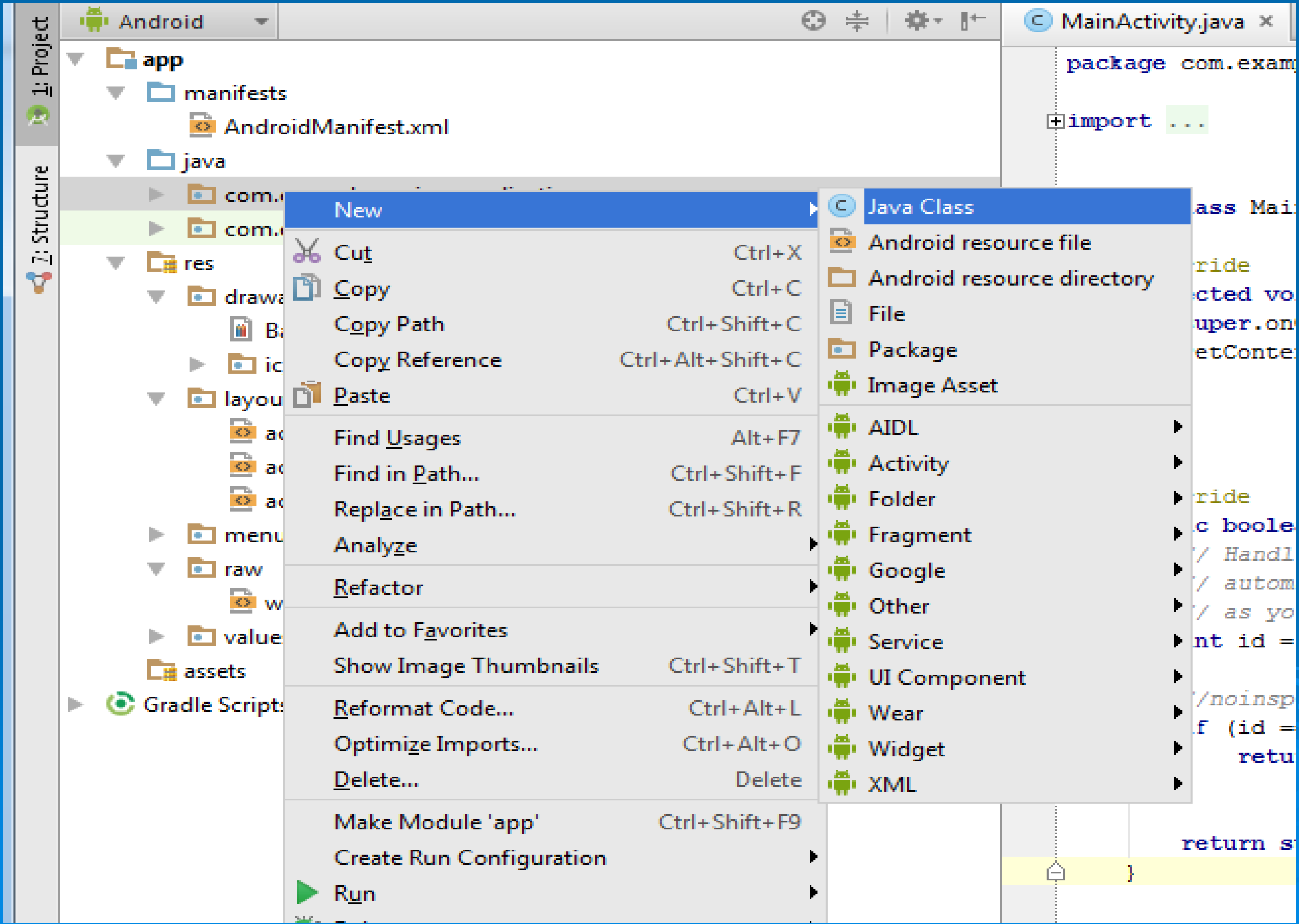
- Used to create an instance of a class (i.e. create an object)

- Intent intent;
- intent = **new** Intent(**this**,ActivityA.**class**);

- Button button = new Button(this);

- A constructor method has the same name as the name of the class

Creating a custom View



```
public class GameView extends View {
    // declare variables needed for View
    private Paint redPaint;

    public GameView(Context context) {
        super(context);
        redPaint = new Paint();
        redPaint.setColor(Color.RED);
    }

    @Override
    protected void onDraw(Canvas canvas) {
        canvas.drawCircle(50, 50, 10, redPaint);
    }
}
```

Creating a GameView

- Declare
- **GameView GV;**
- In onCreate() put
- **GV = new GameView(this);** // creates the custom view
- **setContentView(GV);** //sets the content view to the game view and that is then displayed

How a view works

- Constructor Function
  - "init" method for the view

- Canvas provided to draw on

- onDraw()
  - Called automatically when view constructed
  - Use draw methods
    - canvas.drawCircle(50, 50, 10, redPaint);
    - canvas.drawText("output here", 50, 50, null);
    - plus others
  - Call invalidate() to force further calls to onDraw()

Drawing bitmaps

- Declare
- **private Bitmap ball1;**

- attach the image in drawable in the GameView’s constructor (after super(context)
- **ball1 = BitmapFactory.decodeResource(getResources(), R.drawable.ball);**

- and drawn in onDraw()
- **canvas.drawBitmap(ball1, 10, 10, null);**

Graphic

- Graphic 0,0 top left
- ball.getWidth();
- ball.getHeight();

Events/MotionEvents

- android.view.MotionEvent class for screen touch data
- MotionEvent contains info about active touch points on screen
- event.getAction()
  - ACtION_DOWN, ACTION_MOVE, ACTION_UP
- event.getX()

```
public boolean onTouchEvent(MotionEvent event) {
     int eventaction = event.getAction();

     switch (eventaction ) {
         case MotionEvent.ACTION_DOWN:
             output = "down";
             break;
         case MotionEvent.ACTION_MOVE:
             output = "move";
             break;
         case MotionEvent.ACTION_UP:
             output = "up";
             break;
     }
     invalidate();
     return true;
 }
```

“hittest”

- if(X > ballX && X < ballX + ball.getWidth() && Y > ballY && Y < ballY + ball.getHeight()) isHit = true;

Random numbers

- ballX = (int)(Math.random()*720);
- ballY = (int)(Math.random()*1280);
-
- where Math.random() gives a double between 0 and 1.