**Kotlin**

**Day 1**

1-if you don’t want **to count wrong answer**, you can use (try and catch) inside while loop and add the incrementation at the end of (try)

So, if there is any mistake the try will crash before the incrementation happen.

Ex:

while(a<3) {

try {

User should Enter Number

If user enter String, the program will go to catch, and won’t do the next line

a++

}

catch {

}

}

2-you can use **(when)** in this way:

when {

A==5 -> do something

10<b<0 -> out of range

else -> do something

}

Or (the same as switch in Java):

When (x){

1 -> do something

15-> do something

Else -> {something 1

Something 2

}

3-I tried with var **Str=readLine(): 🡺** Str=String (Input Type String)

1. Str.equals(“STRING”)
2. Str == “STRING”

And it all works

4-It is hard to make (for loop) infinite. So instead, if you want **infinite loop** you should use (While Loop)

1. for (I in 1..3)
2. While (true)

5-**var num=readLine()!!.toInt()** 🡺 num=Integer (Change Input to int)

You should use try and catch to catch Errors. 🡺 Ex: (User Enters String)

6-to ask computer for **Random Number** we use:

var x=Random.nextInt(11) 🡺 it will give us number between (0 and 10) 11 not included

or

val x=Random.nextInt(7,15) 🡺 it will give us number between (7 and 14) 15 not included

7**-**difference between **var and val**:

var: can be change. 🡺 var x=15 🡺 x=10 (correct)

val: can’t be change. 🡺 val x=15 🡺 x=10 (Wrong)

8-**String**:

var str=”Hello”

* if(str[0].isUpperCase()) 🡺 true or false 🡺 **Check 1st litter if Upper Case**
* for (i in str) println(i) **🡺 print all character** in the String alone
* Str.equals(“String”) 🡺 true or false 🡺 compare 2 Strings

9-**Any:**

* It’s a variable type
* Is can be any type (String, Int, Array, etc…)
* Most use with arrays and maps so **they can contain any type**
* Ex: var x:Any =5 🡺 x=”hit” 🡺 x=’s’

**Day 2**

1-we could **use readLine with String**:

* var str=readLine()!!.toString()
* var str=readLine()!!
* var str=readLine().toString()

2-we could **check the readLine Entry** by using if condition

* if(!readLine().isEmpty())
* if(!readLine().isBlanck())

3-The **difference between ArrayList and arrayListOf**

When we initialize empty 2D Array we can write:

-ArrayList<ArrayList<String>>()

-arrayListOf<ArrayList<String>>()

but we can't put the arrayListOf inside:

ex: arrayListOf<arrayListOf<String>>()

because arrayListOf is function, and inside these brackets <> only accept Types ex:(String) or classes ex:(ArrayList)

4-we can use these **functions with the list and arrays**

* list.sort() 🡺 to sort numbers
* list.size == list.count() 🡺 to know the length
* list.sum() 🡺 to sum the numbers inside the array

**Ex: val avrg = list.sum().toFloat()/list.size**

5-we **add to the 2D array** using

arary.add(*arrayListOf*(“item1”,”item2”))

6-i can use **print method with 2D array using for loop** inside for loop:

for(i in answers) {  
 for (c in i)  
 *print*("$c ")  
 *println*()  
}

The (i) will take the elements inside the answers. 🡺 i= arrayListOf.

The (C) will take the elements inside the (i). 🡺c= item1 , item2.

So, it like this: Ansewrs 🡺 i 🡺 c

Answers[0] 🡺arrayListOf 🡺 [item1,item2]

Answers[1] 🡺arrayListOf 🡺 [item1,item2]

Etc…

**Or**

for(i in answers)  
 *println*("Country ${i[0]} its Capital ${i[1]}")

Since (i) is arrayListOf, we can Print its Elements.

Don’t Forget To **Use The {} inside the String** to Print The Array

**Or**

println(answer[0][0])

7-**Always use float with numbers** 😊

8-to **enter char (single char – single number)** can’t enter two numbers (55)

val c=*readLine*()!!.*single*()

9-**Functions Can Be Written outsit the main**. Anywhere before or after

**Functions also can be Written inside the main**, however you should write the function on the top of the main Before you call it. Because if you write the function last, and you call it first there will be an error because the compiler couldn’t compile the function yet.

10-we could **use list or arrays** this way: 🡺 **to chose random color** from the list.

* val colors = listOf("Red", "Blue", "Green", "Yellow")
* var color = colors[Random.nextInt(colors.size)]

this code will save random color from the colors list

11-**Fuctions**:

**Ex1:**

fun sum (num1:Float , num2:Float) : Float 🡺 num1 and num2=**Parameters**. **|** :Float 🡺 **return** Type

{

return num1+num2

}

**Ex2:**

fun sum (num1:Float , num2:Float=0) : Float 🡺 if user didn’t send num2 value, **the Default Value** =0

13- difference between **array, list and arrayList:**

* list 🡺 can’t change elements – can’t Add – can’t Delete
* array 🡺 **can** Change Elements – can’t Add – can’t Delete
* arrayList 🡺 **can** Change Elements – **can** Add – **can** Delete

they all can **hold** **any type**. 🡺 ex: var x=listOf(5,”hi”,true)

if we want to change elements Better to identify **type = Any** 🡺 ex: var x=arrayListOf<Any>(“hi”,1)

to **print them**:

* print(list) 🡺 will print all elements
* for (i in list) print(i) 🡺 print each element of list
* for (i in array) print(i) 🡺 print each element of array
* for (i in arrayList) print(i) 🡺 print each element of arrayList

to **change Elements**: 🡺 array[0]=newElement

to **add Element**: 🡺 arrayList.add(NewElement)

to **Delete Elements by value**: 🡺 arrayList.remove(ElementValue) 🡺 ElementValue= “Name”

to **Delete Elements by Index**: 🡺 arrayList.remove(arrayList[Index])🡺arrayList[Index]=ElementValue

14-**var x:Int** 🡺initialize variable x with type Int with no value

**Day 3**

1-To **Compare 2 Strings with ignore case**: 🡺 true = ignore case

“String”.*equals*(“String”,true)

2-we can **identify the variables inside the constructer in classes identifier**:

abstract class a(name:String){} 🡺 here we don,t need to use var or val because we aren’t gana use

it, also you can’t call the variable by the object.

class b(val name:String):a(name){} 🡺 here we used val because we are going to use name to send it

to class a, also can be called by object.

3-**2D arrayList**: 🡺 to make it **mix types elements** change **String to Any**

We can **specify the size of it** like this: 🡺 ex: 2D array ( **3\*3** )

**Ex1**: var array =arrayListOf<ArrayList<String>>()

array.add(arrayListOf(“item1”,”item2”,”item3”)

array.add(arrayListOf(“item1”,”item2”,”item3”)

array.add(arrayListOf(“item1”,”item2”,”item3”)

so we add **3 lines and in each line we have 3 items** 🡺 **3\*3**

we can do it in **initializing** the arrayList **without add function**

**Ex2:** var array=arrayListOf( arrayListOf(“item1”,”item2”,”item3”),

arrayListOf(“item1”,”item2”,”item3”),

arrayListOf(“item1”,”item2”,”item3”)

)

Array 2\*2

arrayListOf

arrayListOf

Item2

Item1

Item2

Item1

4-**for Loop:**

* for(x in “Helloe”) 🡺 x = each characters in “Helloe”
* for(x in array) 🡺 x= each element in array
* for(x in 1..10) 🡺 x= numbers from 1 to 10
* for(x in 1 until 11) 🡺 x = numbers from 1 to 10 (11 not included)
* for(x in 0..array.size-1)==for(x in 0 until array.size) 🡺 x = index of array = 0 to array.size-1

(last number (array.size) not included)

5-**Dictionary = Map**

* **Initialize**: val dictionary=mapOf(‘key’ to ‘value’)

🡺 key = any number or string or both.

🡺 value = any type (Int, Float, String, arrayListOf)

* Printing **unsexist key** will print **null**
* **.getOrDefault** will print default value if key has no value
* **.keys** call all keys
* **.containsKey(key)==.contains(key)** 🡺 true or false 🡺 check if key exist or not
* **.containsValue(value)** 🡺 true of false **🡺** check if dictionary has this value or not
* We **can’t add, change or delete** to the map
* **Ex:**

|  |  |  |
| --- | --- | --- |
| val dec= *mapOf*( 1 *to arrayListOf*(1,5) , "a" *to* 5 , 6 *to* "jhg" , 5 *to* 1..5 ) | | |
| **Print Method** | **OutPut** | **Notes** |
| for (i in dec)  *println*("$i\t") | 1=[1, 5]  a=5  6=jhg  5=1..5 | Print each key with elements  in different rows |
| println(dec) | {1=[1, 5], a=5, 6=jhg, 5=1..5} | Print all Keys with Elements |
| println(dec["a"]) | 5 | Print key (5) value |
| println(dec.keys) | [1, a, 6, 5] | Print all Keys only |
| for(i in dec.keys)  println(dec[i]) | [1, 5]  5  jhg  1..5 | Print Elements on different row  Using Keys |
| println(dec[2]) | null | No (2) key |
| println(dec.getOrDefault(2,"Hi")) | Hi | Print default since no (2) key |
| println(dec.containsKey(5)) | true | Check key (5) |
| println(dec.contains("jhg")) | false | Check key (“jhg”) |
| println(dec.containsValue("jhg")) | true | Check element (“jhg”) |

6-**difference between Map and MutableMap:**

* Map 🡺 can’t change – can’t Add – can’t Remove
* MutableMap 🡺 can Change – an Add – can Remove

Ex: val MM=mutableMapOf(key to value)

MM[old key]=new value 🡺 Change value

MM[new key]=new value 🡺 Add new Key with Value

MM.remove(key) 🡺 remove Element

* If we **initialize 2 same keys** the program will take the value of last key was initialized

Ex: val MM=mutableMapOf(1 to “hi”, 2 to “bye”,1 to “s”) 🡺 1 = “s”

* If we **remove unsexist key** the program won’t do anything and will continue
* To **initialize empty MutableMap** we identify Type (Any, String , Int etc…)

Ex1: val MM=mutableMapOf<Int,String>() 🡺 key type Int – elements type String

Ex2: val MM=mutableMapOf<Any,Any>() 🡺 keys and elements type Any

* We can **use for loop to take keys and elements in variable**

Ex: for ((key,value) in mutablePam) 🡺 key = keys – value = elements

7-we can **write the classes inside the main**.

Ex: **fun main (){**

abstract class animal (name:String){ 🡺name == constructers

abstract fun speak ()

}

class dog (val name : String) : animal { 🡺 name = constructers 🡺 : inherits animal class

name = name 🡺 the name from animal class will take the name from dog class

override fun speak () { 🡺 should write override for inheriting the fun

println(“Wolf”)

}

}

}

8- to make dog **class shorter**:

class dog (val name : String) : animal (name) { 🡺 name will be sent to animal class to save it

}

**Android Studio**

1-If we want to **initialize variable outside onCreate fun** we should write: **lateinit** before the variable.

Ex: lateinit var number: TextView 🡺 number of type TextView

2-to **change color of Text View**:

Ex: textview.setTextColor(Color.*GREEN*)

3-to **initialize layout types** we use: findViewById<Type>(R.id.layoutID)

Ex: val add=findViewById<Button>(R.id.*Plus*)

4-to **call the color of the view text** we use: textview.currentTextColor

Ex:if (enrtey.currentTextColor==Color.GREEN) 🡺 true or false

5-to **change position of text view** we use: textview.setPadding(left,top,right,down) 🡺 all int

Ex: entery.setPading(0,0,0,10) 🡺 will move the text view up

6- <**TextView**  
 android:id="@+id/Numbers" 🡺 **Text View ID**  
 android:layout\_width="wrap\_content" 🡺 **layout size**  
 android:layout\_height="wrap\_content"  
 android:text="0" 🡺 **content of the text view**   
 android:textSize="100dp" 🡺 **change text size**  
 app:layout\_constraintBottom\_toBottomOf="parent" 🡺 **layout position**  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toTopOf="parent" />

7- **<Button**  
 android:id="@+id/Mines"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1" 🡺 the space inside the layout  
 android:text="-" />

8- the **space inside the layout**: if there are many layouts, if all =1 they will take equal spaces. But if one =1 and the other = 2 then the other will take two third of the space.

Ex: android:layout\_weight="4"

9-**Snackbar**: is used to **show message to the user**, we can show it inside the main class uses constraint layout, But we do that we should initialize id for the constraint layout.

Ex: Snackbar.make(ConstraintLayoutName, "Please Enter Valid Value", Snackbar.*LENGTH\_LONG*).show()

.show used to show the message.

10-**EditText**: used to **take input from user**.

Ex: var input = EdetTextNsme.text.toString() 🡺 change the input into String

11-to **check if user enter something** or not we use **isNotBlank()**.

Ex:if (EditTextname.text.isNotBlank)

12-to make the **input field empty** after user input something we use **null**.

Ex: EditTextName.text = null

13-**<EditText**  
 android:layout\_width="0dp" **🡺 change the size to fit the space and stretch**, instead of using (wrap\_content) and (match\_parent)  
 android:background="#000000" 🡺 **change background color** to Black  
 android:hint="Please Enter Here" **🡺 show a hint to user** to know what to enter

android:textStyle="bold" 🡺 **add style to text**. Ex: **bold**  
 android:textColor="#FFFFFF" 🡺 **set color to input text** (white)  
 android:textAlignment="center" 🡺 make the text **centered**   
 app:layout\_constraintBottom\_toTopOf="@+id/rvMain" /> 🡺 make it **connected from bottom to another element top** id (rvMain)

14-**Lisener**: used with **anything needed for user reaction**. Ex: **Button – CheckBox – LayoutOnClick**

Ex: ButtonName.setOnClickListener **{** TextView.text = “Hello”**}** 🡺 will happen when user click button

15-**this**: refer to the **same class that used in it**.

Ex: this.title = “My App Name” 🡺 **changing the Name** of the app

16-**recreate**: used to **restart the app**.

Ex: this.recreate()

17-**intents**: used to **switch between classes**. We can use it with button to change to another class.

Ex: startActivity(Intent(this, TheCassThatWeWantToGoName::class.*java*))

Note: we need to **initialize all classes** in AndroidManifest.xml file.

Ex: <activity  
 android:name=".ClassName"  
 android:exported="true">  
 <intent-filter>  
 <action android:name="android.intent.action.MAIN" />  
 </intent-filter>  
 </activity>

18-**Toast**: the same as Snackbar. Used to **show message to user**.

Ex: Toast.makeText(this, "New Task Added Successfully", Toast.*LENGTH\_LONG* ).show()

Differences between Snackbar and Toast:

|  |  |
| --- | --- |
| **Toast** | **Snackbar** |
| Will stay up the whole full time until it finishes, even if we ask it again. After finish it will show the next asked message. | When ask again, the old message will disappear and the new message will show |
| Small, faded and gray background color | Big, bold and black background color |
| Uses this (class) to show the message | Uses layout to show message |

19-**Alert Dialog**: used the same as Message Dialog in Java. Used to **show Message Box** to user to alert the user or to **take Input from user** in Message Box.

Ex: val input = EditText(this) 🡺 imaginary EditText to take input  
input.*hint* = "Enter Task Here" 🡺 show hit to user for input  
dialogBuilder = AlertDialog.Builder(this) 🡺 initialize Alert  
dialogBuilder.setMessage("Please Enter Task to Do:") 🡺 set the Message for the alert dialog box  
 .setCancelable(false) 🡺 user can’t skip this box Message  
 .setPositiveButton("ADD") **{ 🡺** set the button namedialog,id **->** val str =input.*text*.toString() 🡺 taking input  
 if(str.*isNotBlank*()) { 🡺 check if input = null  
 toDoList.add(str) 🡺 add the input to arrayList  
 Toast.makeText( 🡺 showing toast Message to user  
 this,  
 "New Task Added Successfully",  
 Toast.*LENGTH\_LONG* ).show()  
 }  
 else  
 Snackbar.make( 🡺 showing Snackbar Message to user  
 outMainL,  
 "Please Enter Task",  
 Snackbar.*LENGTH\_LONG* ).show()  
 **}** .setNegativeButton("Cancel") **{**dialog,id **->** dialog.cancel()**}** 🡺 set another button to cancelval alert = dialogBuilder.create() 🡺 create the Alert Dialog  
alert.setTitle("Add New Task") 🡺 set Title to Alert Dialog  
alert.setView(input) 🡺 let the user see the input field  
alert.show() 🡺 Display the Alert Dialog

20-**Manual Debugging**: used to **find unwanted result** in our program. By adding stop point in our codes, you will run the program step by step (code by code) starting from the stop point that was placed, to monitor the program behavior.

21-**Menu**: used to create **menu to the application** for the user to use. Works the same as button, Ex: Switching from class to class. Can be shared by all classes.

Ex: -**onCreateOptionsMenu fun** 🡺 **Bind the menu Xml File With the main Class and Add New Button Menu**

override fun onCreateOptionsMenu(menu: Menu?): Boolean

*menuInflater*.inflate(R.menu.*MenuXmlFile*,menu) 🡺 Bind The menu

if (menu != null) {  
 item3 = menu.add("Main Menu") 🡺 Add new Button  
 return true  
 }

- **onPrepareOptionsMenu fun 🡺 To Rename The Button**

override fun onPrepareOptionsMenu(menu: Menu?): Boolean {  
 val item1=menu!!.getItem(0) 🡺 Option Button 1  
 val item2=menu.getItem(1) 🡺 Option Button 2  
 item1.*title*="Main Menu" 🡺 Changing The Title (Name)  
 item2.*title*="Android Studio Review"  
 return super.onPrepareOptionsMenu(menu)  
 }

-**onOptionsItemSelected fun 🡺 What to do when menu selected**

override fun onOptionsItemSelected(item: MenuItem): Boolean {  
 when(item.*itemId*){  
 R.id.*Option1Button* -> { 🡺 what to do when click  
 Do Something ……  
 return true  
 }

R.id.*Option2Button* -> {  
 Do Something ……  
 return true  
 }  
 }  
 return super.onOptionsItemSelected(item)  
 }

22-some of if condition you might need:

* **“String”.startwith(“correct”)** 🡺 true or false
* **“String”.endwith(“try again”)** 🡺 true or false

23-**Kill Button**, making the **button and the EditText unclickable**.

Ex: ButtonName.isEnabled = false

ButtonName.isClickable = false

Ex: EditTextName.isEnabled = false

EditTextName.isClickable = false

24-**Recycling View: Extensions way:**

1. Add to build.grandle (Module: …) file 🡺 found under Gradle Scripts file

plugins **{**…..  
 id 'kotlin-android-extensions'  
**}**

1. Create item view .xml file 🡺 used to show the organized data in the main app page

* Created with Linear Layout 🡺 make sure to make the high wrap\_content
* Add Text View to bind with the organized data
* Use android:layout\_margin="15dp" 🡺 to make spaces around the layout

1. Create Recycler View Adapter .kt file 🡺 used to organize and add to the recycler view

class RecyclerViewAdapterNumber (private val answers:List<String>): 🡺 list can be other variable RecyclerView.Adapter<RecyclerViewAdapterNumber.ItemViewHolder>(){  
 class ItemViewHolder (itemView : View): RecyclerView.ViewHolder(itemView) {  
 }  
 override fun onCreateViewHolder(parent: ViewGroup, viewType: Int): ItemViewHolder {  
 return ItemViewHolder(  
 LayoutInflater.from(parent.*context*).inflate( 🡺 used to initialize the item view xml file  
 R.layout.*item view xml file*,  
 parent,  
 false  
 )  
 )  
 }  
 override fun onBindViewHolder(holder: ItemViewHolder, position: Int) {  
 val answer=answers[position]  
 holder.itemView.*apply* **{ 🡺** used to add and print to the recycler viewtvGussies.*text*=answer  
 if(answer.*startsWith*("Sorry"))  
 tvGussies.setTextColor(Color.*RED*)  
 else  
 tvGussies.setTextColor(Color.*GREEN*)  
 **}** }  
 override fun getItemCount(): Int { 🡺 return the size of recycler view  
 return answers.size  
 }  
}

1. Add in main class initialization for recycler view and connect it to the adapter.kt file.

private lateinit var myRV : RecyclerView 🡺 outside the onCreate fun

myRV=findViewById(R.id.*Item\_View\_XML\_File\_Name*) 🡺 inside the onCreate fun

var Adapter= RecyclerViewAdapterKtFileName (ArrayLestName)

myRV.*adapter* = Adapter

myRV.*layoutManager* = LinearLayoutManager(this)

1. Use myRV.*adapter*?.notifyDataSetChanged() 🡺 used to update the recycler view information after add or delete from the ArrayList.
2. Use myRV.scrollToPosition(ArrayListName.size-1) 🡺 used to go to the last row of the recycler view during the application running.

25-**Recycling View: Binding way,** with **Delete** andusing the **onClickLisener inside the main** and **using CheckBox:**

1. Add to build.grandle (Module: …) file 🡺 found under Gradle Scripts file

android **{**…….buildFeatures**{** viewBinding=true  
 **}**

……..

**}**

1. .xml file 🡺 the same as Extensions way
2. Create Class to hold the recycler view elements (TextView and Check Box)

class Group (val task : String,var checkBox : Boolean = false) {  
}

1. Create Recycler View Adapter .kt file with CheckBox and delete fun 🡺 used to organize and add to the recycler view

class RecyclerViewAdapter (private val toDoList : ArrayList<Group>) : RecyclerView.Adapter<RecyclerViewAdapter.ItemViewHolder>(){  
 private lateinit var myListener: OnItemClickListener  
 interface OnItemClickListener{  
 fun onItemClick(position: Int)  
 }  
 fun setOnItemClickListener(listener:OnItemClickListener ){  
 myListener=listener  
 }  
 class ItemViewHolder (val binding: ItemsViewBinding, listener: OnItemClickListener): RecyclerView.ViewHolder(binding.*root*) {  
 init {  
 itemView.setOnClickListener**{** listener.onItemClick(*adapterPosition*)  
 **}** }  
 }  
 override fun onCreateViewHolder(parent: ViewGroup, viewType: Int): ItemViewHolder {  
 return ItemViewHolder(  
 ItemsViewBinding.inflate(  
 LayoutInflater.from(parent.*context*),  
 parent,  
 false  
 )  
 ,myListener  
 )  
 }  
 override fun onBindViewHolder(holder: ItemViewHolder, position: Int) {  
 val group=toDoList[position]  
 holder.binding.*apply* **{** textViewList.*text* = group.task  
 textViewList.setTextColor(Color.*BLACK*)  
 checkBoxList.*isChecked* = group.checkBox  
 checkBoxList.setOnCheckedChangeListener**{** \_,checked **->** when (checked){  
 true -> {  
 textViewList.setTextColor(Color.*GRAY*)  
 group.checkBox = true  
 }  
 else ->{  
 textViewList.setTextColor(Color.*BLACK*)  
 group.checkBox = false  
 }  
 }  
 **}  
 }** }  
 fun DeleteChecked (){  
 toDoList.*removeAll* **{** list **->** list.checkBox **}** notifyDataSetChanged()  
 }  
 override fun getItemCount(): Int {  
 return toDoList.size  
 }  
}

1. Add in main class initialization for recycler view and connect it to the adapter.kt file. And add the onClickLisener for the recycler view in the main also.

private lateinit var myRV : RecyclerView 🡺 outside the onCreate fun

private lateinit var ArrayListname : ArrayList<ClassName>

ArrayListName = arrayListOf()

ArrayListName.add(ClassName(Variable 1,…))

myRV=findViewById(R.id.*Item\_View\_XML\_File\_Name*) 🡺 inside the onCreate fun

var Adapter= RecyclerViewAdapterKtFileName (ArrayLestName)

myRV.*adapter* = Adapter

myRV.*layoutManager* = LinearLayoutManager(this)

Adapter.setOnItemClickListener(object : RecyclerViewAdapter.OnItemClickListener {  
 override fun onItemClick(position: Int) {

Do somthing  
 }  
})

1. Add delete order for the main.

DeleteButton.onClickLisener{

var countDeletedItem = 0  
 for(i in ArrayListName)  
 if (i.checkBox)  
 countDeletedItem++

if (countDeletedItem>0)  
 {  
 Toast.makeText(this,"$countDeletedItem Tasks Deleted",Toast.*LENGTH\_LONG*).show()  
 adapter.DeleteChecked()  
 }

26-**Saving / Restoring Instance States**: to save the data from being erased when rotating the screen, we use keys to refer to the save location (index):

override fun onSaveInstanceState(outState: Bundle) { 🡺 **to save data temporary before destroy**   
 super.onSaveInstanceState(outState)  
 outState.putInt("myNumber", count) 🡺 saving int type

outState.putStringArrayList("NoR",ArrayListName) 🡺 saving String array list  
 outState.putString("answer",”String”) 🡺 saving String  
 outState.putCharArray("phraseView",charArrayName) 🡺 saving Char Array  
}

override fun onRestoreInstanceState(savedInstanceState: Bundle){ 🡺 **restore data after destroyed**  
 super.onRestoreInstanceState(savedInstanceState)  
 count = savedInstanceState.getInt("myNumber", 0) 🡺 restoring int type or default 0

ArrayListName = savedInstanceState.getStringArrayList("NoR")!! 🡺 restoring String Array List  
 ”String”) = savedInstanceState.getString("answer")!! 🡺 restoring String  
 charArrayName = savedInstanceState.getCharArray("phraseView")!! 🡺 restoring Char Array  
 text.*text* = count.toString() 🡺 to restore the data that shows to the user  
}

**Note**: we can use the **restore codes inside onCreate fun** instead of outside fun:

override fun onCreate(savedInstanceState: Bundle?) {  
 super.onCreate(savedInstanceState)  
 setContentView(R.layout.*activity\_main*)

…….

if(savedInstanceState!=null){

count = savedInstanceState.getInt("myNumber", 0)

ArrayListName = savedInstanceState.getStringArrayList("NoR")!!   
 ”String”) = savedInstanceState.getString("answer")!!   
 charArrayName = savedInstanceState.getCharArray("phraseView")!!   
 text.*text* = count.toString()

}

…….

}

27- **Shared Preferences**: used to **save the data even if the app closed**.

private lateinit var sharedPreferences: SharedPreferences 🡺 inside the class but Outside all fun

sharedPreferences = this.getSharedPreferences( 🡺 initialize Inside onCreate fun  
 getString(R.string.*preference\_file\_key*), Context.*MODE\_PRIVATE*)

var highestScore = sharedPreferences.getInt("HQ",0) 🡺 restoring int or default 0

*with*(sharedPreferences.edit()) **{ 🡺** used to save dataputInt("HQ",highestScore)  
 apply()  
**}**

**Note**: you need to **make changes to strings.xml** file:

<resources>  
 ………..  
 <string

name="preference\_file\_key">com.example.GuessThePhrase2.PREFERENCE\_FILE\_KEY

</string>

……….  
</resources>

27-**Activity Lifecycle**: all app passes throw 6 main functions,

you can use Log.d(“myLocation”,”I’m her”) inside each function to monitor how and when the program will do each function, also you can use it to write code if specific action happen,

Ex: before the program crashes you can save the data by shared profile inside onStop fun.

* **onCreate() - onStart() - onResume()**
* **onPause() - onStop() - onDestroy()**

Ex: override fun onStop() {  
 *with*(sharedPreferences.edit()) **{** putInt("balance", balance)  
 apply()  
 **}** super.onStop()  
 }

28-**Drawables**: is to **add new icon** made by you, you can use it with **Image Button**, or menu that always shows.

Steps for creating the Drawable:

1. Right click on drawable file.
2. New 🡪 Vector Asset.
3. Chose name and icon to add.
4. Fix the size, color, and shape.
5. Click Next 🡪 Finish.

New drawable was add and you can use it how ever you want.

29-**Floating Action Button**: when created you should choose an **icon** for it, you can use it with drawable we created, or any auto icon in the list. A Floating Action Button 'hovers' (**Stay on the Top**) over other views. This keeps it in place no matter what is happening with the rest of our activity.

You can **use it as any normal button** when coding, but initialize it with:

private lateinit var addButton : FloatingActionButton

30-**Animations**: it can **make icons or image Move**, Bringing some life to our app.

Ex: add new movement to our Floating Action Button:

1. Right click on res file 🡪 New 🡪 Android Resource File
2. Name the File (rotate\_Animmation) and choose the type (Animation)
3. Add this Code for rotating 360 degree:

<rotate  
 android:pivotX="50%" 🡺 make sur it is rotating around itself  
 android:pivotY="50%" 🡺 make sur it is rotating around itself   
 android:fromDegrees="0" 🡺 start rotating from 0 degree  
 android:toDegrees="360" 🡺 end angle for rotating 360 degree  
 android:duration="250" 🡺 250 Milliseconds  
 />

1. In our class we add these codes:

private lateinit var rotateAnimation: Animation 🡺 outside onCreate fun

//we initialize the animation and connect it inside onCreate fun

rotateAnimation = AnimationUtils.loadAnimation(this, R.anim.*rotate\_Animation*)

//we start the animation for the floating action button when something happen (on click)

fabButton.startAnimation(rotateAnimation)