5COSC023W - MOBILE APPLICATION DEVELOPMENT
Lecture 4: More on Kotlin - Android Shared Preferences

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Classes

```
class Employee (colour: String, n: String) {
    val eyeColour: String = colour
    var age: Int = 25
    val name: String = n

    override fun toString(): String {
        return "name: $name, eyeColour: $eyeColour, age: $age"
    }
}

fun main() {
    val e1 = Employee("green", "John")
    println(e1)
}
```

Creating Class Properties Automatically

- Use var or val when you declare the parameters of the constructor:

```
class Employee (val eyeColour: String,
                var age: Int,
                var name: String) {
    override fun toString(): String {
        return "name: $name, eyeColour: $eyeColour, age: $age"
    }
}

fun main() {
    val e2 = Employee("brown", 18, "Helen")
    println(e2)
}
```

Variable Number of Arguments

- Use the `vararg` keyword.
- The `vararg` parameter becomes an `Array`.
- A function definition can only specify one parameter as `vararg`.
- Try to choose the last parameter of a function to be the `vararg`.

```
fun foo(date: String, vararg names: String) {
    println("date: $date")
    for (n in names)
        println(n)
}

fun main() {
    foo("26th of February", "James", "Helen", "Joe", "Alice")
}
```

Maps

```
fun main() {
    var capitals = mapOf("Netherlands" to "Amsterdam",
                         "Hungary" to "Budapest",
                         "Finland" to "Helsinki")

    println(capitals["Hungary"])
    println(capitals.getValue("Finland"))

    for ((key, value) in capitals)
        println("$key -> $value")

    for (entry in capitals)
        println(entry.key + ":: " + entry.value)
}
```

Sets

Cannot contain duplicate elements.

```
fun main() {
  var cities = mutableSetOf("London", "Paris",
                            "Berlin", "London",
                            "Paris")


    for (c in cities)
        print(c+ " ")
    println()

    cities += "Warsaw"
    cities -= "Paris"

    print("Updated set contains: ")
    for (c in cities)
        print(c + " ")

}
```

The usual mathematical set operations (union, intersection, difference and others) are also available.

Nullable References - An Attempt to fix Tony Hoare's "Billion Dollar Mistake"

- By default, references cannot receive the value of `null`.
  ```
  var s: String = null  // Compiler error!
  ```
- A question mark `?` needs to be appended to make a variable nullable:
  ```
  var s: String? = null // OK
  ```
- A nullable type cannot be dereferenced:
  ```
  var s2: String? = "abc"
  s2.length  // Compiler error!
  ```
- Use the safe call `?.` to attempt to dereference a nullable value:
  ```
  var s2: String? = "abc"
  s2?.length  // Will give back a value of null if s2 is null
  ```
- Alternatively, use the non-null assertion operator `!!`
  ```
  var s3: String? = "abc"
  s3!!  // if null throws a NullPointerException
  ```

Comparing Variables

- Use == (or `equals`) for structural comparison
- Use === to check if 2 references point to the same object

Saving Data in an Android Application

- Use `onSaveInstanceState()` for configuration changes or system destroying and re-creating the activity.
- Saving Key-Value Sets (small amounts)
- Saving in Files
- Saving in SQL databases (large amounts of structured data)

SharedPreferences (Saving Key-Value Sets)

To create a new shared preference file or access an existing one, call one of the following methods to get a `SharedPreferences` object:

- `getSharedPreferences()`: if you need multiple shared preferences files (the name of the preference file is the first argument) - can be called from any `Context` in the app

  ```
  sharedPref: SharedPreferences =
          getSharedPreferences("preference_filename",
                                       Context.MODE_PRIVATE);
  ```

- `getPreferences()`: call from an activity to use only one shared preference file associated with the activity

  ```
  sharedPref = getPreferences(Context.MODE_PRIVATE);
  ```

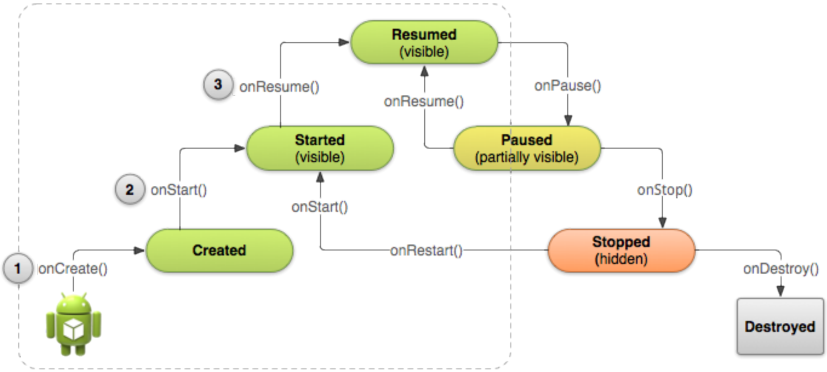
  Usage of `MODE_WORLD_READABLE` or `MODE_WORLD_WRITEABLE` imply that any other app can access your data (if it knows the filename)

Saving Key-Value Sets (Writing to Shared Preferences)

1. Create a `SharedPreferences.Editor` by calling `edit()` on `SharedPreferences`.
2. Write the keys and values with `putInt()`, `putString()`, etc.
3. Call `apply()` or `commit()`.

```
sharedPref: SharedPreferences  = getActivity().getPreferences(
                                               Context.MODE_PRIVATE);
editor: SharedPreferences.Editor = sharedPref.edit(); // step 1
editor.putInt("key_name", newHighScore); // step 2
editor.apply();  // step 3
```

The Activity Lifecycle (cont'ed)



Resumed (visible)
3 onResume()
onResume()
onPause()
Started (visible)
Paused (partially visible)
2 onStart()
onStart()
onStop()
Created
onRestart()
Stopped (hidden)
1 onCreate()
onDestroy()
Destroyed