Icons Decision Making Controls Pt1

```
Course Code: ELEE1146

Course Name: Mobile Applications for Engineers

Credits: 15

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```

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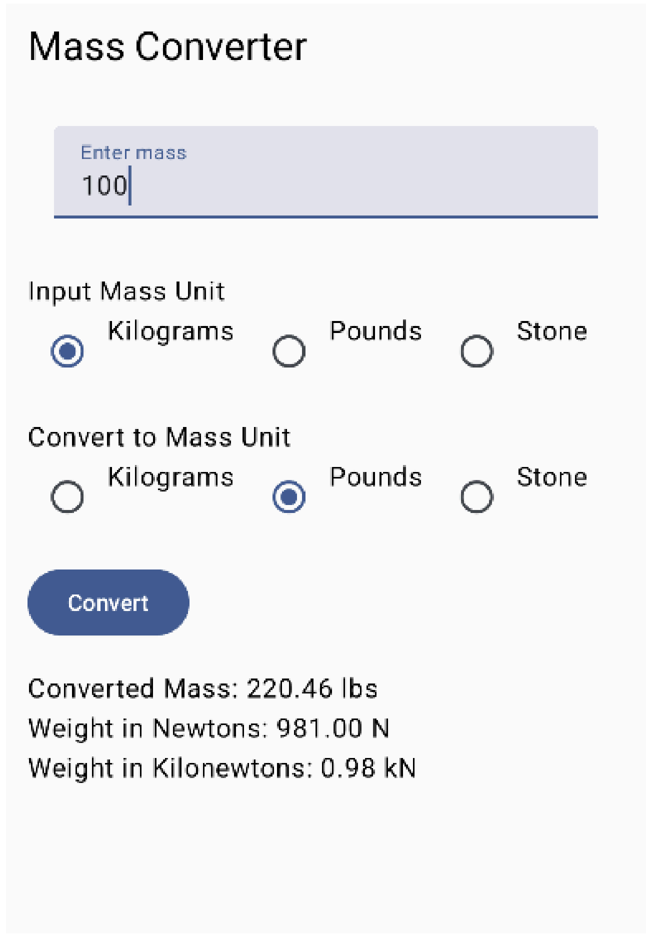
The Mass Convertor App


Mass Converter

Enter mass
100

Input Mass Unit
[✓ Kilograms] Pounds Stone

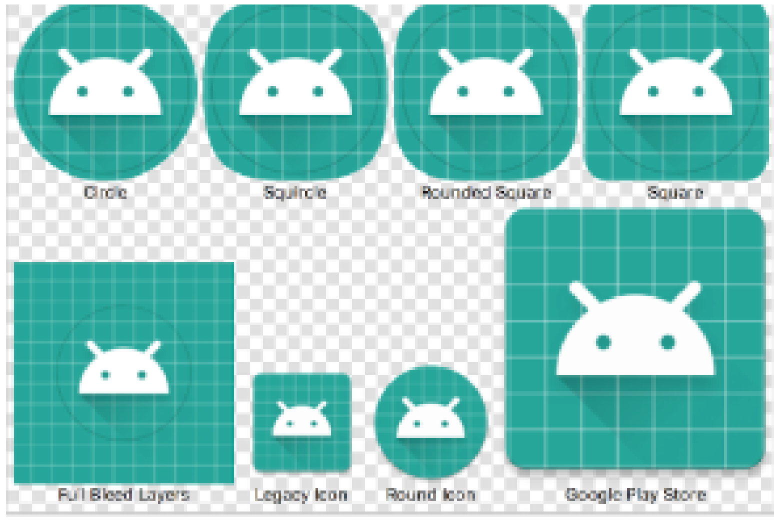
Convert to Mass Unit
Kilograms [✓ Pounds] Stone

Converted Mass: 220.46 lbs
Weight in Newtons: 981.00 N
Weight in Kilonewtons: 0.98 kN

Launcher Icons

The Launcher Icon allows you to view which apps are available

- An icon is a graphic that takes up a small portion of screen space and provides a quick, intuitive representation of an app
- High-quality launcher icons can influence users to purchase your app
- Icons can establish brand identity
- Icon dimensions are 48 X 48 pixels
- The prefix ic_launcher is used to name launcher icons for Android apps.



Switch Components

Documentation for switch<controls>

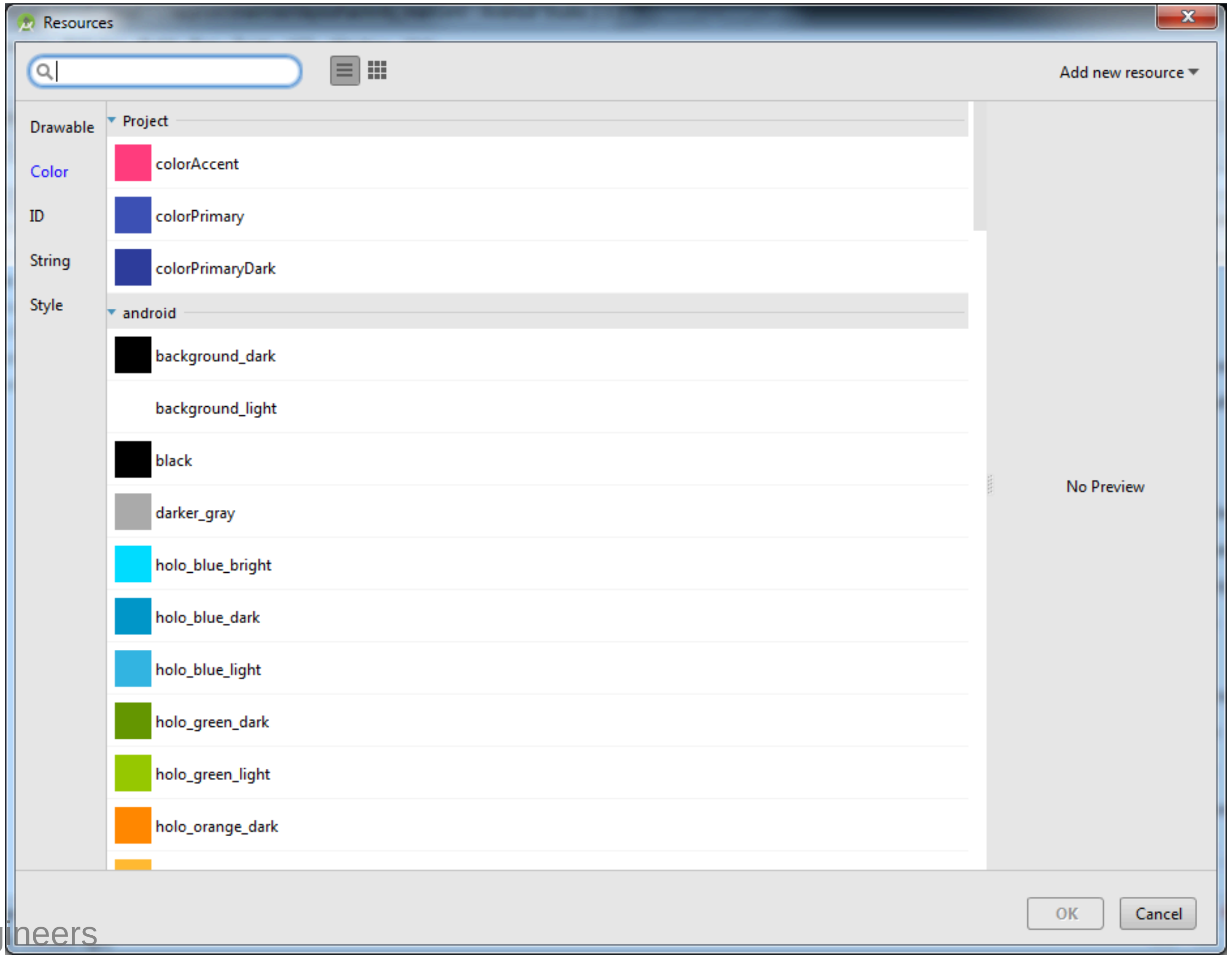
- Switch components allow users to select one option from a set.
  - Can be arranged horizontally or vertically (by default)
  - Has a label defined by the text property
  - Can be initially set to checked or unchecked
  - Only one `switch` in the group can be selected at a time
  - Good to offer a default selection (checked == `true`) for the option that is used most

Changing the Text Color of Android Controls

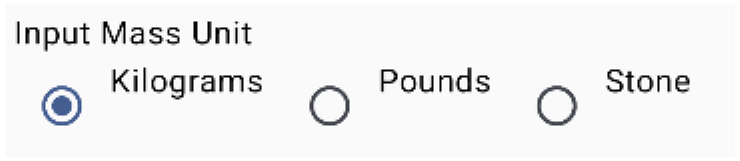
- Use **hexadecimal color codes** to represent RGB (Red,Green,Blue)
  - https://htmlcolorcodes.com/
- Codes range from `00` to `FF` (`00` none, `FF` none)
- Codes are indentified by a hashtag sign, followed by the RGB values
  - `#FF0000` is Red
  - `#00FF00` is Green
  - `#0000FF` is Blue
  - `FFFF00` is Yellow (Red + Green)

Changing the Text Color of Android Controls

- You can also choos some basic colours from the Resources dialog



Coding a `Switch` Control


Input Mass Unit

```
 Text("Input Mass Unit")
Row {
    RadioButton(selected = inputMassUnit == "kg", onClick = { inputMassUnit = "kg" })
    Text("Kilograms")
    Spacer(modifier = Modifier.width(8.dp))
    RadioButton(selected = inputMassUnit == "lbs", onClick = { inputMassUnit = "lbs" })
    Text("Pounds")
    Spacer(modifier = Modifier.width(8.dp))
    RadioButton(selected = inputMassUnit == "stone", onClick = { inputMassUnit = "stone" })
    Text("Stone")
}
```

Control Statements

- To branch the program execution - selection statements
  - `if, if/else`
  - `when`
- To repeat actions - loops
  - `while, do ... while, for`
- Boolean expressions to make decisions `true` and `false`
  - Using relational operators
  - Using boolean operators

Relational Operators

Relational Operators	Meaning	Example	Resulting Condition
`==`	Equal to	`6 == 6`	True
`!=`	Not Equal to	`4 != 7`	True
`>`	Greater than	`3 > 2`	True
`<`	Less than	`8 < 1`	False
`>=`	Greater than or equal to	`5 >= 5`	True
`<=`	Less than or Equal to	`9 <= 6`	Flase

Logical Operators

Logical Operator	Meaning	Example
`&&`	And, all conditions must be true	`if(flight <  400 && hotel < 120)`
`||`	Or, at least one conditions must be true	`if(stamp < 0.49 || rate == 2)`
`!`	Not, reverse the meaning of the condition	`if(! (grade > 70))`

Truth Tables

Operator	!Operator
value	value
`false`	`true`
`true`	`false`

Operand1	Operand2	Logocal AND (`&&`)	Logical OR (`||`)
`false`	`false`	`false`	`false`
`false`	`true`	`false`	`true`
`true`	`false`	`false`	`true`
`true`	`true`	`true`	`true`

Logical Operators Example

```
{
    val i1 : Int = 20
    val i2 : Int = 7
    val i3 : Int = 7
    var result: Boolean // default value is false

    result = !(i1 == i2)
    result = i1 != i2 // same as !(i1 == i2)

    result = i1 == i3
    result = i1 > i2 && i1 == i3
    result = i1 > i2 || i1 == i3
}
```

Logical Operators Example 2

```kotlin
{
  val i1 : Int = 20
  val i2 : Int = 7
  val i3 : Int = 7
  var result: Boolean // default value is false

  result = !(i1 == i2); // true
  result = i1 != i2; // true

  result = i1 == i3; // false
  result = i1 > i2 && i1 == i3; // false
  result = i1 > i2 || i1 == i3; // true
}
```

Flow of Control

- The order of statement execution in a program or method is called the **flow of control**
- Unless specified otherwise, the order of statement execution is linear: one statement after the other in sequence
- Some programming statements modify that order, allowing us to:
    - decide whether to execute a particular statement, or
    - repeat a statement execution over and over
- These decisions are based on **conditions** in the program that evaluates to true or false

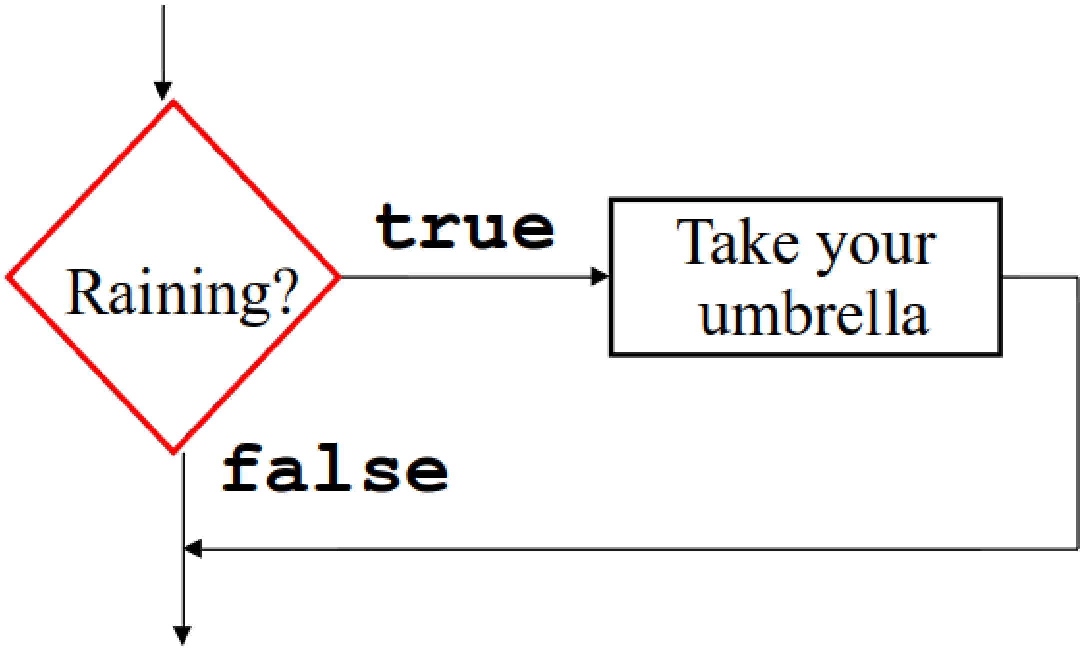
Selection Statements

- A **selection statement** lets us choose which statement will be executed next
- Selection statements are sometimes called **conditional statements**
- Selection statements give us the power to make decisions and branch the program execution
- Single Selection
    - the `if` statement
- Double Selection
    - the `if/else` statement
- Multiple Selection
    - the `when` statement

Single Selection Statement

- `if ( booleanExpr )` statement inside the brackets is the conditional check;
- Example:
  - It is raining outside. Take your umbrella.

    Flowchart

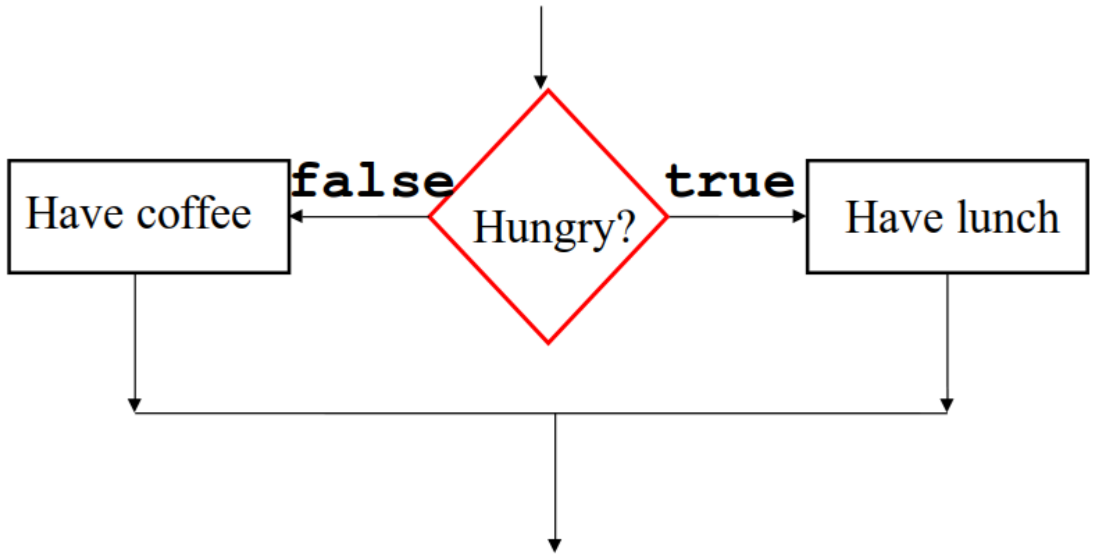


The `if` Statement: Examples

```
if ( countNumbers == 10 ) print( )

if ( grade >= 90 )
  print( “You are an excellent student!” )

if ( account <= creditLimit )
   print( “You have insufficient credit!” )

if ( dayOfTheWeek > 5 )
{
    print( “Time to relax…” )
    print( “Weekend.”)
}
```

Double Selection Statement

- `if( booleanExpr ) statement1 else statement2`
- **Example**
    - If you are hungry - go for lunch, otherwise take a cup of coffee.
- **Flowchart**



The `if/else` Statement Examples

```
if ( dayOfTheWeek > 5 )
{
  print( “Weekend.”)
  print( “Time to relax…” )
}
else
{
  print( “Workday.”)
  print( “Go to work!” )
}
```

Statement Example

```
val grade : Char = ‘A’;

if ( grade == ‘A’)
  print( “Excellent mark”)
else
   if ( grade == ‘B’ )
     print( “Very good mark”)
   else
     if ( grade == ‘C’ )
       print( “Average mark”)
     else
       if ( grade == ‘D’ )
         print( “Below average mark”)
       else print(“Failing mark”)
```

Multiple Selection Statment

```
when ( Expression ){
  case_value -> statement1
  case_value -> statement2
  …
  case_valueN -> statementN
  else -> {
    statementD
  }
}
```

The `when` Statement: Example

```
when (grade) {
    'A' -> print("Excellent mark")
    'B' -> print("Very good mark")
    'C' -> print("Average mark")
    'D' -> print("Below average mark")
    else -> {
        print("Failing mark")
    }
}
```

Auto Increment and Decrement

- The increment and decrement operators are unary arithmetic operators with integer operand
- The auto increment operator (`++`) adds one to its operand
- The auto decrement operator (`--`) subtracts one from its operand
- The statement

  ```
  var++;
  ```

  is functionally equivalent to

  ```
  var = var + 1;
  ```

Data Validation and Toast Notifications

- **Data Validation**
  - User entries must be checked for reasonable values
- **Toast Notification**
  - A toast notification communicates messages to the user (message slides upward into view like toast popping out of a toaster)

```
Toast toast = Toast.makeText(context, text, duration).show()
...
Toast.makeText(this@MainActivity, "Mass must be greater than 0", Toast.LENGTH_LONG).show()
```

Using the `isChecked()` Method of `RadioButton` Controls

- `when` to determines if which `RadioButton` has been selected ...

```
val massInKg = when (inputUnit) {
            "kg" -> mass
            "lbs" -> mass / conversionToPounds
            "stone" -> mass / conversionToStones
            else -> 0.0
        }
```

```
if (condition1) {
    // code
} else if (condition2) {
    // code
} else {
    // code
}
```

```
when {
    condition1 -> // code
    condition2 -> // code
    else -> // code
}
```

```
switch (value) {
    case 1:
        // code
        break;
    case 2:
        // code
        break;
    default:
        // code
}
```

Coding the Button Event

```
Button(onClick = {
                val mass = massEntered.toDoubleOrNull()

                if (mass != null && mass > 0) {
                    convertedValues = convertor(numberFormat,mass, inputMassUnit, outputMassUnit)

                } else {
                    Toast.makeText(this@MainActivity, "Mass must be greater than 0",
                        Toast.LENGTH_LONG).show()
                }
            }) {
                Text("Convert")
            }
```

`Map`

- `Map` is a **collection** that contains pairs of objects (key, value)
- The first value of the pair is the key and the second is the value of the corresponding key.
- If multiple pair have same key then map will return the last pair value.
- The map entries is traversed in the specified order.

-
  ```
  fun main(args : Array<String>)
  {
       // declaring a map of integer to string
       val map = mapOf(1 to "University", 2 to "of", 3 to "Greenwich")
            // printing the map
            println(map)
  }
  ```

```
{1=University, 2=of, 3=Greenwich}
```

`map`

```
fun main(args: Array<String>)
{
    //declaring a map of integer to string
    val map = mapOf(1 to "Proud", 2 to "to" , 3 to "be", 4 to "Gre")
    println("Map Entries : "+map)
    println("Map Keys: "+map.keys )
    println("Map Values: "+map.values )
}
```

▶ Output

`map` and `repeat()`

```
val lyricalGenius = mapOf("Greeting" to "Hi, ", "Statement" to "my name is, ", "InterrogativeProNoun" to "what?",
      "InterrogativeProNoun2" to "Who?", "Alliteration" to "chka-chka,","Name" to "Slim Shady" )

  print(lyricalGenius["Greeting"])

  repeat(2) { i ->
      if (i == 0) print("${lyricalGenius["Statement"]}${lyricalGenius["InterrogativeProNoun"]}")
      else {
          // Print the greeting and statement values
          print(" ${lyricalGenius["Statement"].toString()
              .replaceFirstChar { if (it.isLowerCase()) it.titlecase(Locale.getDefault()) else it.toString() }}")
          // Print the interrogative pronoun value based on the iteration index
          print("${lyricalGenius[if (i % 2 == 0) "InterrogativeProNoun" else "InterrogativeProNoun2"]}")
      }
  }
  // Print the alliteration and name values
  print( "\n ${lyricalGenius["Statement"].toString().
    replaceFirstChar { if (it.isLowerCase()) it.titlecase(Locale.getDefault()) else it.toString() }}" +
          "${lyricalGenius["Alliteration"]} ${lyricalGenius["Name"]} \n")
```

▶ Output