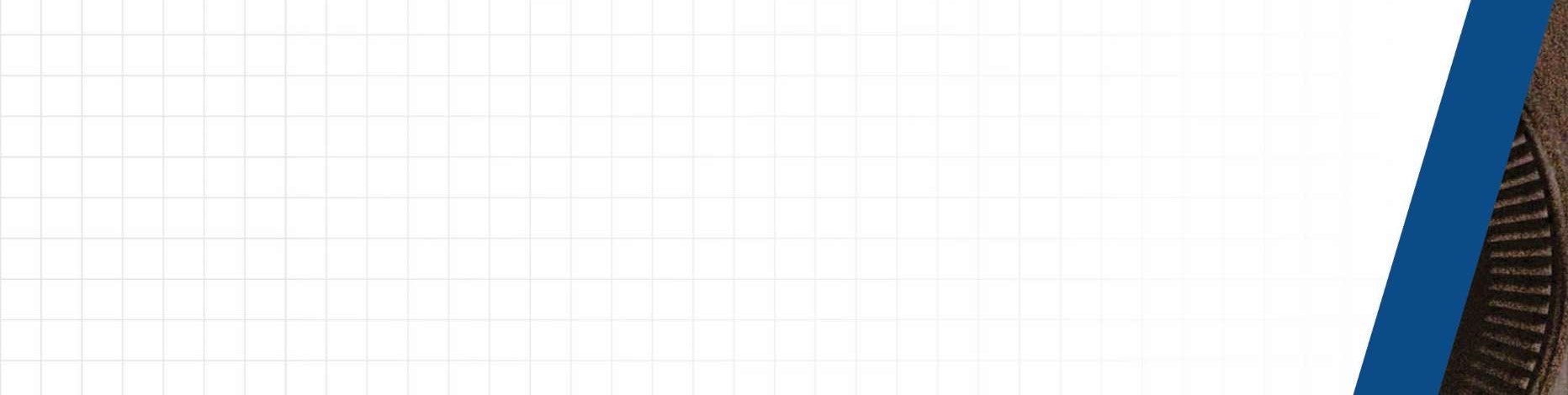
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Mini Project Report

Android Development

Details

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V – Model Document

Mini Project Name

# Scientific Calculator

* PART I– Research
* 1.1 Introduction
* 1.2 Ageing
* 1.3 Costing

* PART II – My product features

* PART III – SWOT Analysis
* 3.1 Strength
* 3.2 Weakness
* 3.3 Opportunities
* 3.4 Threats

* PART IV – Detail Requirements
* 4.1 High level requirements
* 4.2 Low level Requirements

* PART V – Design
* 5.1 System Design  a) Structural diagram
* b) Behavioural diagram

* 5.2 Unit Design  a) Structural diagram
* b) Behavioural diagram

* PART VI – Test Plan
* 6.1 Unit Testing
* 6.2 Integrated Testing

* PART VII - Reference

1. **Research** 
   1. **Aging**
   2. **Costing:**

|  |  |
| --- | --- |
| Ageing | Costing |
| Casio MJ-100Da 150 Steps Check and Correct  Desktop Calculator | Cost: 515 |
| cltizen CT 512 correct and check Basic Calculator | Cost: 99 |
| Bambalio 8 Digits BL-100 Portable Pocket Calculator with 3 Years Warranty Orange | Cost: 185 |
| D-DEVOX Basic Calculator | Cost: 115 |
| PICKMALL ORPAT43 Basic - Battery Powered | Cost: 280 |
| Casio LC-160LV Basic - Battery Powered | Cost: 137 |

Table 1: Aging and Costing

* 1. **Introduction**

Calculators are hand-held electronic devices for calculating mathematical problems. For doing those lengthy and mind-boggling calculations, use simple and basic calculators. The Simple calculator project allows users to calculate basic five arithmetic operations in mathematics namely addition, subtraction, multiplication, division and modulo. Specially designed with special features to meet the basic needs of young students and professionals and businessmen.

1. **My Product** 
   * + 1. Pocket size
       2. Waterproof IP68
       3. Anti-Break technology which protects calculator body on being dropped.
       4. Soft Touch Rubber Keys, Up to One Thousand Hits per key Life.
       5. Indian Comma Marker for easy reading of numbers in Lakh & Crore.
       6. Two-Way Power (Solar + Battery)
       7. Large, easy to read 12-digit display 8. Anti-Scratch LCD Screen for a Longer Life.
       8. Easy to convert from one unit to other.
       9. Available in phone itself with multiple functionality.

1. **SWOT Analysis:**

|  |  |  |
| --- | --- | --- |
| Strength |  | Weaknesses |
| * Innovative and user-friendly product * Long lasting as it has all kinds of basic arithmetic calculations required for quick use * Simple layout * Contains solar powered battery – no need to replace * Cheap * Android app made possible to use it from anywhere. * No need to remember the formulae for conversion. | * No Warranty * Implemented for some functionality only |  |
| Opportunities |  | Threat |
| * Find some way to deal with its competitors, either by strong marketing or adapting new technologies If application crash. It won’t work | * If application crash. It won’t work * Multiple application of available in app store |  |

Table 2: SWOT Analysis

1. **Detailed Requirements:** 
   1. **High level requirements:**

|  |  |
| --- | --- |
| ID | Description |
| HL\_01 | Able to select item(digit/number) on keyboard of Calculator |
| HL\_02 | Able to Display given input by user on Screen |
| HL\_03 | Able to select item (Respective signs) on keyboard of Calculator |
| HL\_04 | Able to cancel wrong input given by user through Cancel key |
| HL\_05 | Able to select key for getting output |
| HL\_06 | Able to see desired output on Screen |
| HL\_07 | ‘Meter to Km’ button to get value in km |
| HL\_08 | ‘Meter to cm’ button to get value in cm |
| HL\_09 | ‘KG to pound’ button to get value in Pound |
| HL\_10 | ‘Celsius to Fahrenheit ‘ button to get value in Fahrenheit |
| HL\_11 | Text box to display the calculated value |
| HL\_12 | ‘Male’ button for selecting male. |
| HL\_13 | ‘Female‘ button for selecting females. |
| HL\_14 | ‘Calculate’ button for calculation |
| HL\_15 | Text box to display the calculated value |
| HL\_16 | Accuracy |

Table 3: High level requirements

* 1. **Low level requirements:**

|  |  |
| --- | --- |
| ID | Description |
| LL\_01 | Display should be well organized in order |
| LL\_02 | Key to display mapping needs to be confirmed |
| LL\_03 | Store the inputs given by user in string |
| LL\_04 | Convert the string input into respective data type |
| LL\_05 | Perform the expected operations on given inputs by user |
| LL\_06 | Convert result in string format and Display it in string format only |
| LL\_07 | Display 0.0 if no selection i.e. if no option is selected |
| LL\_08 | On Calculate should display result |
| LL\_09 | Response time should be less |

Table 4: Low level requirements

1. Design
   1. Behavioral diagrams:
      1. Use Case diagram:

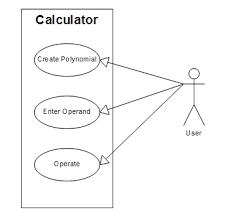


Figure 1: Use Case diagram

* + 1. Flow chart :

Diagram

Description automatically generated

Figure 2: Flow diagram

* 1. **Structural diagrams:**

* + 1. Composite structure diagram:

* + 1. Class diagram:

Diagram

Description automatically generated

**Figure 4: Class diagram**

1. **Testing** 
   1. **Unit testing:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test id | Description | Expected input | Expected output | Actual output |
| HL\_01 | Selecting a number | Clicking on the required key | Taking the selected key & storing it | - |
| HL\_02 | Display the number | Click on the required key & store it | Display the selected number | - |
| HL\_03 | Selecting a sign/output key | Clicking on the required key | Taking the selected key & storing it | - |
| HL\_04 | Clear the input | Select any key & cancel it (this value shouldn’t be stored) | Clear the selection | - |
| HL\_05 | Calculate Temperature  (C->F) | 32 degree Celsius | It should display 89.6 | - |
| HL\_06 | Calculate distance  (m->km) | 2000 meters | It should display 2 km | - |
| HL\_07 | Calculate length  (m->cm) | 90 meters | It should display 9000 cm | -- |
| HL\_08 | Calculate weight  (kg->pounds) | 60kg | It should display 132.27 pounds | - |
| HL\_09 | Your weight is normal | 43kg+153cm | It should display 19.1 | - |
| HL\_10 | You Are  Overweight | 65kg+157cm | It should display 26.4 | - |
| HL\_11 | You are  Obese | 75kg+157cm | It should display 30.4 | - |
| HL\_12 | You are  Extremely  Obese | 85kg+155cm | It should display 35.4 | - |
| HL\_13 | You are underweight | 45kg+145cm | It should display 21.4 | - |

Table 5: Unit testing

* 1. **Integration testing:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test id | Description | Expected input | Expected output | Actual output |
| T1 | Display | Give inputs to display | Display in default calculator order | - |
| T2 | Map keys | Select the required keys | Mapping the keys to unique values | - |
| T3 | Store the numbers/signs | Select the key | Take the selected key &  store it in any stl concept & do the necessary conversions | - |
| T4 | Operations | Give the operands & operator | Perform the given algorithms & display the output | - |
| T5 | If not selected  Any option | Should select at least one | It should display 0.00 | - |

Table 6: Integration testing

1. Reference

1. Used a tool for designing the UML diagrams called draw.io. https://app.diagrams.net/
2. Researched the content from the following website. https://malaysiavending.com/food-vending-machine
3. Evolution on SWOT Analysis. https://www.libfocus.com/2016/11/swot-analysis-for-libraries-compilation.html
4. Formulae <https://www.rapidtables.com/convert/temperature/how-celsius-to-fahrenheit.html>
5. Details about unit converter <http://www.unitconversion.org/unit_converter/energy.html>