NAME: Kalu-Umeh David
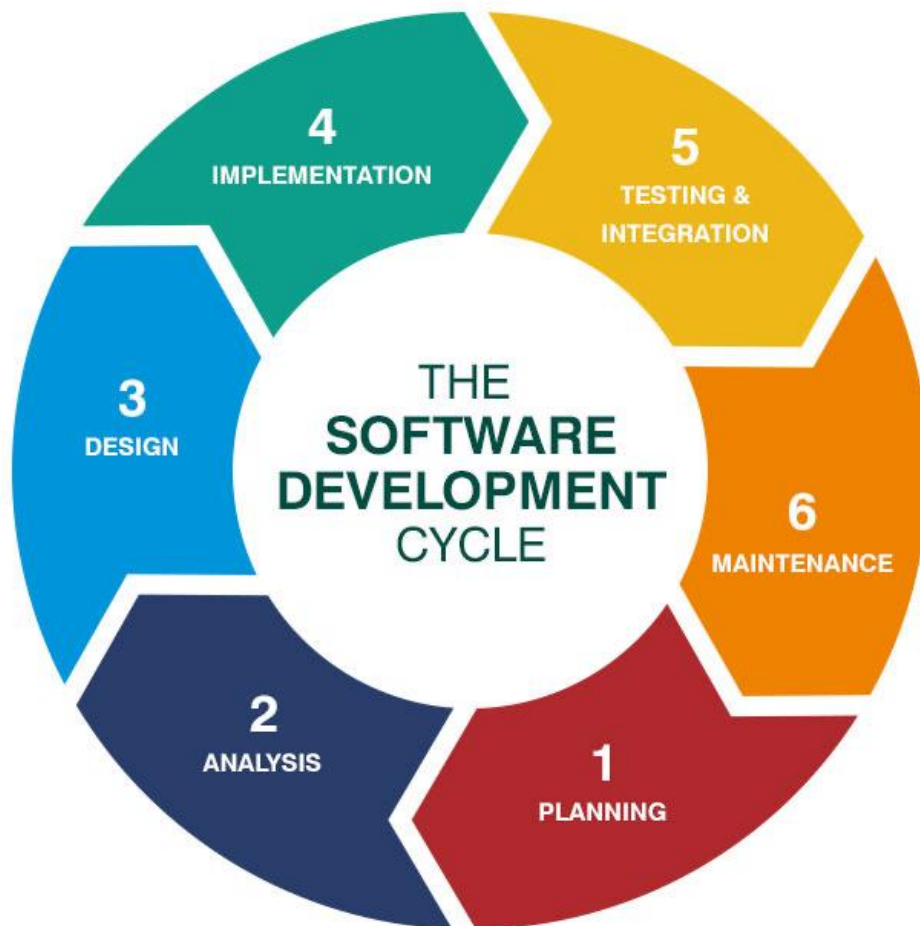
MATRIC NO.: 18/ENG04/047

DEPARTMENT: ELECTRICAL ENGINEERING

Software Development Life Cycle (SDLC)

There are six (6) stages of software development

1.   Planning: This is the most fundamental part of the SDLC process. It is performed primarily by a team of developers along with input or suggestions from customers and stakeholders. In this case the problem

is the dry season in ABUAD farm and we are to solve this problem by making an Automated Irrigation system that measures soil temperature, moisture and also includes a timer to wet the soil and plants

2.   Analysis: This stage involves the defining of project goals as functions as well as what operations the intended application should have

3.   Design: In this stage the product's optimal architecture is designed. Normally the design is reviewed by stakeholders. They review the screen layout, business rules, process diagrams and other documentation

4.   Implementation: This is where the development of the application is done. Developers use various programming languages like C, C++, Java, Python etc. After this stage the application is put into production. In the problem given, the project had been divided into three fields (Field A, Filed B, Field C). Each field has a valve and flow meter numbered from 1-3 with valve4 and flowmeter 4 being the main

5. Testing and Integration: This involves bringing the various parts of software and hardware together into a dedicated testing environment to check for errors, bugs and other issues. During this phase, the application is checked to ensure that defects are tracked, reported, fixed and tested until it meets quality standard

The following questions can be asked during testing

Does the application meet business requirements and objectives?

Is it reliable?

Are there any remaining bugs?

Does it function according to approved functional requirements?

Aspects of the program that did not satisfy clients should be noted so the errors and inconsistencies of other projects can be corrected

6. Maintenance and Updates: When testing is complete, the product is released into the market. Developers maintain the app by regularly updating and "squishing bugs" to keep the app free of viruses

Hardware and Software feature

Arduino: Arduino is an open-source hardware and software company, project and user community that designs and manufactures soil

moisture and temperature sensors as well as the software that programs them

Sublime text: This is a text editing app for programmers to test, run and debug their codes

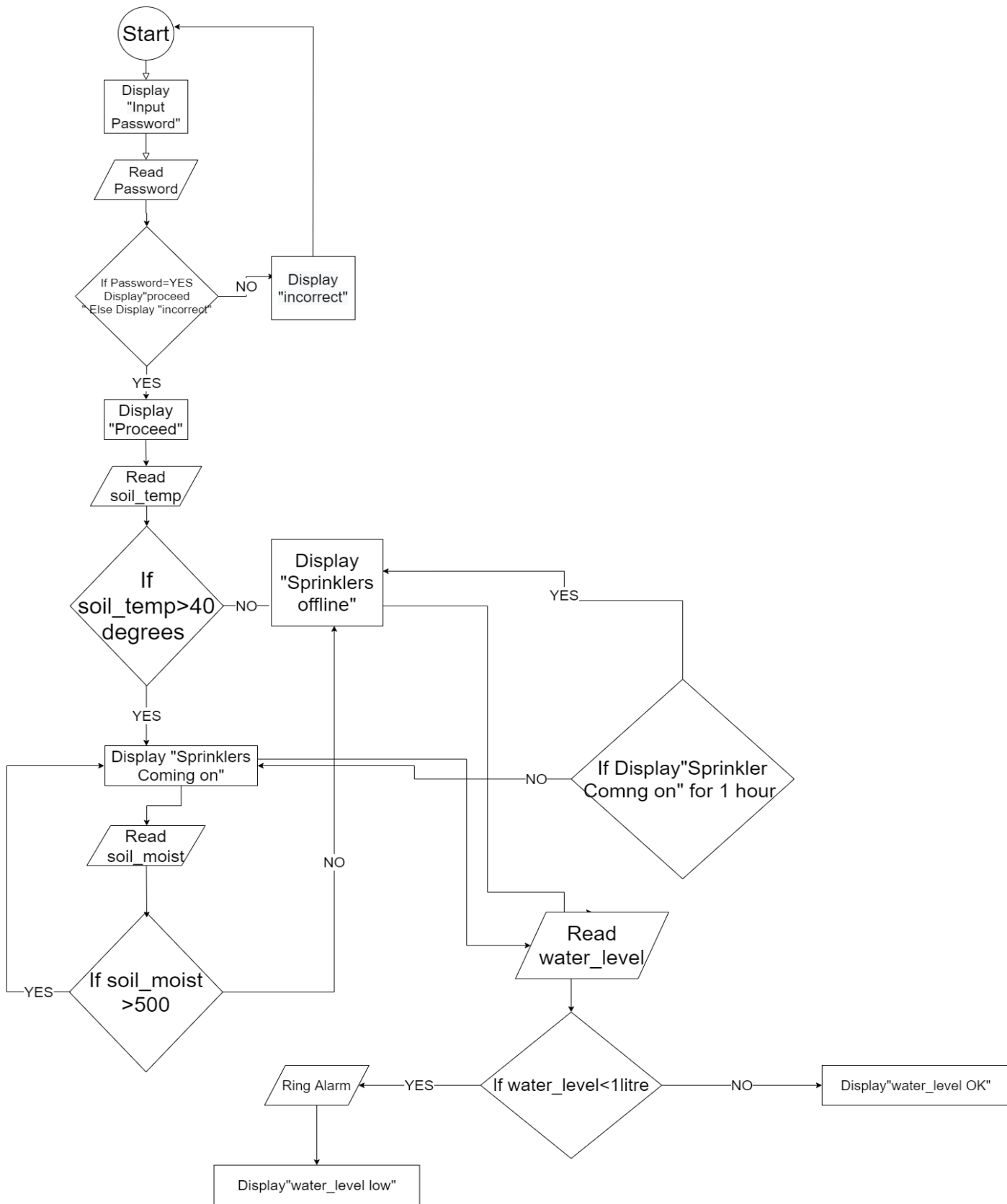Alarm: This would send an alert if the water for irrigation is not enough

Moisture sensor: Soil moisture sensors measure the volumetric water content in soil. And example is Arduino moisture sensor

Temperature sensor: This measures the temperature of the soil

Level sensor: This tells the level of water in the tank at a particular time

Stopwatch: This would time the interval for the water system

Flow-Chart

```
                    Start

                      │
                      ▼
              ┌──────────────┐
              │   Display    │
              │   "Input     │
              │  Password"   │
              └──────────────┘
                      │
                      ▼
               ╱ Read    ╱
              ╱ Password╱
                      │
                      ▼
                  ◇ If Password=YES
                    Display"proceed"  ──NO──► ┌───────────┐
                    Else Display "incorrect"  │  Display  │
                  ◇                           │"incorrect"│
                      │                        └───────────┘
                     YES
                      ▼
              ┌──────────────┐
              │   Display    │
              │  "Proceed"   │
              └──────────────┘
                      │
                      ▼
               ╱ Read      ╱
              ╱ soil_temp ╱
                      │
                      ▼
                  ◇ If              ┌──────────────┐
                    soil_temp>40 ──NO──►│   Display    │◄──YES──
                    degrees          │  "Sprinklers │
                  ◇                  │   offline"   │
                      │               └──────────────┘
                     YES
                      ▼
              ┌──────────────┐       ◇ If Display"Sprinkler
              │ Display      │◄──────   Comng on" for 1 hour
        ┌────►│ "Sprinklers  │◄──NO──  ◇
        │     │  Coming on"  │              │
        │     └──────────────┘
        │            │
        │            ▼
        │     ╱ Read      ╱
        │    ╱ soil_moist╱
        │            │
        │            ▼
        │        ◇ If soil_moist         ╱ Read        ╱
       YES──────    >500                ╱ water_level ╱
                 ◇                           │
                                             ▼
                                         ◇ If water_level<1litre ──NO──► ┌──────────────┐
                    ╱ Ring Alarm ╱◄──YES──                              │Display"water │
                                         ◇                              │ _level OK"    │
                         │                                               └──────────────┘
                         ▼
                  ┌──────────────┐
                  │Display"water │
                  │ _level low"  │
                  └──────────────┘
```

Algorithms

1. Start
2. Enter Password
3. Password Correct
4. Proceed
5. Read soil_temp
6. If above 40 degrees sprinkler comes on
7. Else remain closed
8. Read soil_moist
9. If above 400 sprinkler comes on
10. Else remain closed
11. Time sprinker for 1 hour intervals
12. Read water_level
13. If less than 1 litre ring alarm
14. Else water_level ok

Top-Down Design

1. Put down the ideas for the application
2. Analyze those ideas
3. Design and code the application
4. Test the application
5. Do marketing research
6. Sell in store