Project Specification.

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Lecturer:

Module: Project

Course: Higher Diploma in Computer Science.

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1. Introduction.

This project is an application of green technologies for sustainable living. An indoor garden will be

created, where plants (Snake Plant, Peace Lilly and Spider) will help clean and recycle the air. The

technological solution will measure the oxygen and carbon dioxide levels in the air, and display this

using an android application. Building on this idea, other fruit and vegetables will be grown with the

aid of robots to assist with irrigation by using thresholds for dryness and wetness.

This project is broken into 2 parts, the hardware, and the software.

The hardware includes different sensors to measure different quantities in the garden then a native

Android app will be built to monitor and display these values of the garden.

An analysis of green technologies based on IOT solutions will be carried to identify potential

solutions and features for my project. These include:

1. The Raspberry Pi Powered Garden.

2. The Automated Garden System Built Of Raspberry PI For Outdoors or Indoors.

3. Smart Home Gardening System Using Raspberry Pi.

1. Technologies.
   1. Main Controller.

Upon researching different projects it was clear that each one had one main controller, that interfaced between sensors and relayed information to some type of display, weather that display be a LCD screen or Database, for this reason I had to research multiple controllers and pick the best one using a number of metrics.

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| **Controller** | **Cost** | **RAM** | **GPIO** | **Bluetooth** | **WIFI** |
| Raspberry Pi 4B | $35.00 | 8GB | 40 pin | V5.0 | Wi-Fi 802.11b/g/n |
| ODROID XU4 | $95.00 | 2GB | N/A | N/A | Wi-Fi 802.11b/g/n |
| ASUS Tinker Board | $105.00 | 2GB | 28 pin | BLE | Wi-Fi 802.11b/g/n |
| Banana Pi M5 | $16.00 | 4GB | 40 pin | V5.0 | Wi-Fi 802.11b/g/n |

* 1. Sensors.
     1. A Moisture Sensor.

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| **Sensor Name** | **Design Company** | **Cost** | **Interface** | **Photo** |
| Soil Moisture Sensor | MODMYPI | £4 | Digital Interface (On/Off) |  |
| Gravity: Analog Soil Moisture Sensor For Arduino | DFROBOT | £2.40 | Analog Interface. |  |
| Capacitive Soil Moisture Sensor | THE PI HUT | £4.00 | Analog Interface |  |

* + 1. Light Sensor.

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| **Sensor Name** | **Design Company** | **Cost** | **Interface** | **Photo** |
| Light Sensor Detector Module LM393 | Arduino | €1.82 | Digital |  |
| Seeed Studio Light Sensor v1.2 Grove System | Seeed Studio | €3.27 | Digital |  |
| Adafruit APDS9960 Proximity, Light, RGB, and Gesture Sensor - STEMMA QT / Qwiic | Adafruit | $7.50 | Comms Bus (I2C) |  |

* + 1. Oxygen Sensor.

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| **Sensor Name** | **Design Company** | **Cost** | **Interface** | **Photo** |
| I2C Oxygen Sensor | Gravity | €59.00 | Comms Bus (I2C) |  |
| Adafruit CCS811 Air Quality Sensor Breakout - VOC and eCO2 - STEMMA QT / Qwiic | Adafruit | $19.95 | Comms Bus (I2C |  |

* + 1. Temperature & Humidity Sensor.

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| **Sensor Name** | **Design Company** | **Cost** | **Interface** | **Photo** |
| DHT11 | Adafruit | €5.00 | One Wire Communication |  |
| DHT22 | Adafruit | $9.95 | One Wire Communication |  |
| AM2302 | Adafruit | $15.00 | One Wire Communication |  |

* 1. Water Sensor. Irrigation System.

The water irrigation system will be multiple pumps being controlled by a raspberry pi pumping into each container.

There will be moisture sensors that once they pass a threshold value they will trigger the raspberry pi to turn on the water pump to water the plants.

There will also be a button on the app to turn on the water pump for a limited amount of time.

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| A picture containing diagram  Description automatically generated |

* 1. Android Application.

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| Login Screen. | Splash Screen. | User Menu Screen |
|  |
| Measurment Screen. |

1. Outcome.
2. Conclusion.
3. Bibliography.