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| **Student Name:** | **Michael Reed** |
| **Student ID:** | **20056066** |
| **Task:** | **1** |
| **Task Title:** | **Portfolio: Task 1** |
| **Task Code:** | **AT2 POR-Task-1** |
| **Due Date:** | ***Session 07***  *Please see blackboard for the most accurate due date.* |
| **Notes:** | *If you did not DOUBLE CLICK this template, then close the file and do so to create your blank report.* |

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# 01 Client business domain

#### What is the client’s (CUBE Music Pty Ltd) business domain?

Carefully read the scenario the company has provided, and make notes on the key points, requirements, and information.

Once this is done, answer the following question(s):

* What is the client’s (CUBE Music Pty Ltd) business domain?  
  + FYI: your client is an internal client. 20-50 words MAX

Cube Music Pty Ltd is an innovative Perth Based company that specialises in music player software which interfaces with streaming platforms and HiFi equipment.

They typically operate at the high end of the Market and are looking at expanding into the IoT market with a follow me option that can track a user location in various rooms and update the playlist accordingly, with later versions enabling interfacing with mobile devices also

# 02 System fuctionality

#### What is the required system functionality? Name at least two functional requirements.

*Monitoring the Presence in a Room “Follow ME” function, and monitoring of hardware sensors*

*Store data and retrieving the data on the prototype and upload to a centralised storage*

*A dashboard with details for at least one room, with minimum 2 different sensors*

*Must have charts containing data readings and history*

#### What are the non-functional requirements? Name at least twos.

Low Cost Prototype

Readily available Components

Self Contained

# 03 Business Opportunities

#### What are (some of) the business opportunities that CUBE Music’s director JT sees?

Expanding into the IoT market, with the CUBE ecosystem incorporating adaptable music with a “follow Me” trigger when users are in different locations or there is different lighting ie different moods or locations set the music the user wants.

Adaptable and Trackable – can monitor, record and predict user behaviour and habits

Expandable to the Mobile Market as well

#### What could be a risk in trying to achieve those opportunities?

Cost

Interest/loss of Interest from Users

Competitors already in this market or developing something similar

Availability of Parts / supply issues etc

Losing identity of the current brand as we branch out from the current business niche

#### How would you qualify or quantify that risk?

Prototyping will give us an opportunity to test and get user feedback and determine a base cost based off the cost of the prototype

Market research into what users are looking for and what competition there is

Do some costings/ get quotes on Supply and Logistics and small batch vs large production phase costs

# 04 Stakeholders

#### Who are the (potential) stakeholders of this project?

Business Owner/Directors (JT) Any Management and any Investors as well as the Team at CUBE building or working on the project, also users to a certain extent as they are the ones using the software, so indirectly would have a vested interest in having this new function succeed

#### Which of the stakeholders would you consult to determine the scope of the project or to clarify the requirements?

Senior Devs or Director (JT), who may or may not have consulted shareholders

#### Who do you need to consult to obtain final project approval?

Senior Devs sign off then Director (JT) approval after consukltation with any Investors

From a marketing point of view we would need to consult with potential clients to ascertain viability and also possibly lawyers/patent/copyright consultants to check if we are not infringing on a copyrighted product or solution

# 05 Technologies

This section covers possible Technologies that may be used to produce a solution. It covers hardware and infrastructure technologies.

The company needs to know what current technologies exist to allow the creation of a suitable solution.

For example:

* You may wish to identify that LoRa is a suitable technology to use in the solution.
* Likewise, you may identify that the use of the existing wired network may provide some of the infrastructure requirements.20 -50 words MAX

## Hardware Technologies

#### What hardware technologies do you think the company could use to provide a solution to the scenario?

Raspberry Pi, Arduino ESP32 with various sensors ie IR motion, location, facial recognition,

Mobile devices ie computers/phone/ipad

Routers

Perhaps a mesh network if there was wifi interference inside

Existing CUBE solution that connect to HiFi and streaming services

## Infrastructure Technologies

#### What infrastructure technologies do you think they think may use to support the solution to the scenario?

LoRa would be a suitable technology for this due to it being freely available with low power consumption and long/wide range of transmission providing the perfect pathway for use of this IoT device

<https://blog.paessler.com/what-is-lora-a-beginners-guide-part-1>

Mobile device connectivity including connectivity of the software back to back end cloud services

You could also use existing wired or wireless networks where the users frequents, where interference may be a problem, or where the users mobile switches from roaming to wifi connection

# 06 Commercial Options

Complete the table with your commercial options.

Make sure that you have links to the supplier’s web pages.

## Commercial Costings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Supplier | $ per Unit | Quantity | Total |
| Raspberry Pi 4 Starter Kit (2GB) | Core Electronics | 160.00 | 1 | $ 160.00 |
| Raspberry Pi Sense Hat | Core Electronics | 52.80 | 1 | 80.21 |
| Solderless breadboard Jumper Cable Wires 75 pce | Core Electronics | 6.95 | 0 | $ 0.00 |
|  |  |  | 0 | $ 0.00 |
|  |  |  | 0 | $ 0.00 |
|  |  |  | 0 | $ 0.00 |
|  |  |  | TOTAL | $ 0.00 |

## Commercial Supplier Details

|  |  |
| --- | --- |
| Supplier Name | Web Link |
| Core Electronics | [Raspberry Pi Sense HAT - For the Pi 4 / 3 / 2 / B+ / A+ | Core Electronics Australia (core-electronics.com.au)](https://core-electronics.com.au/raspberry-pi-sense-hat.html) |
| Little Bird Electronics | [Little Bird Electronics | Electronics Australia](https://littlebirdelectronics.com.au/) |
| Rs Electronics | [Industrial Solutions | RS formerly known as RS Components (rs-online.com)](https://au.rs-online.com/web/) |
|  |  |
|  |  |
|  |  |

# 07 Prototype Technology Selection

The in-house prototyping requires the consideration of options for the technology and hardware requirements.

When building the prototype, you will have many possible options for gathering data, storing data, device monitoring, and reporting the results 20-50 words MAX

This section covers the choices for technology and costings to implement prototype(s).

## Hardware for Prototype

#### What hardware do you think you could use to create a prototype, or prototypes to solve this problem?

Easiest solution is to start with a raspberry Pi starter kit and sensehat which will have all the required components to run a basic prototype of the solution

## Programming Language(s) for Prototype Development

#### Which programming languages do you believe could be suitable to create the required code for the hardware you have identified above?

Python / Micropython

## Software

#### What software do you believe you could use to assist you in solving the problem?

The raspberry Pi OS.

Pycharm or Visual Studio code IDE running on Windows.

Python 3.1 running on Windows

# 08 Hardware, Sensors and Actuators

For this section update the table in step 04 .

No equipment is provided by the company, but they will purchase suitable hardware to allow the prototype to be constructed.

To begin, presume you will require a Raspberry Pi, and SenseHAT.

Other sensors, actuators and hardware may be required to allow the prototype to perform the required functionality.

Update the documentation with what equipment you will use to implement each feature.

|  |  |  |  |
| --- | --- | --- | --- |
| Feature | Pri | Equipment | Notes |
| Detect presence |  | Raspberry Pi  Raspberry Power Supply  16GB MicroSD Card  Raspberry OS  Sensehat temperature, humidity sensors and joystick | Simulate detect presence by using the joystick to imitate a person entering and moving between rooms |

Presume that you will use a Raspberry Pi for the processor, and only list that with the first feature (we have provided a sample feature in the above table).

Each additional feature may require one or more sensors and/or actuators.

Leave this page BLANK.

# 09 Clarification Notes

For this section update the table in step 04 .

Add any notes to explain any other requirements such as how frequently to make measurements.

|  |  |  |  |
| --- | --- | --- | --- |
| Feature | Pri | Equipment | Notes |
| Detect presence |  | Raspberry Pi 3B/4B  Raspberry Power Supply  32GB MicroSD Card  Raspberry OS  PIR (motion) sensor, or ‘presence sensor’, or door sensor | Make reading:   * every 10 seconds, or * at a user interval. |

Leave this page BLANK.

# 10 Prototype Base Costing

Presuming that you will only be required to purchase new hardware for the prototype(s), complete a proposed cost sheet for the parts you require for the prototype.

Include any SBC, Microcontrollers, wires, electronic components and other items as required.

## Prototype Costing Supplier Option 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Supplier | Price per Unit | Quantity | Total |
| Raspberry Pi 4 Starter Kit (2GB) | Little Bird Electronics | 234.95 | 1 | 234.95 |
| Raspberry Pi Sense Hat | Little Bird Electronics | 80.21 | 1 | 80.21 |
|  |  |  | TOTAL | 315.16 |

## Prototype Costing Supplier Option 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Supplier | Price per Unit | Quantity | Total |
| Raspberry Pi 4 Starter Kit (2GB) | Core Electronics | 160.00 | 1 | $ 160.00 |
| Raspberry Pi Sense Hat | Core Electronics | 52.80 | 1 | 52.80 |
|  |  |  | TOTAL | 212.80 |

## Prototype Component Supplier Details

|  |  |
| --- | --- |
| Supplier Name | Web Link |
| Core Electronics | [Raspberry Pi Sense HAT - For the Pi 4 / 3 / 2 / B+ / A+ | Core Electronics Australia (core-electronics.com.au)](https://core-electronics.com.au/raspberry-pi-sense-hat.html) |
| Little Bird Electronics | [Little Bird Electronics | Electronics Australia](https://littlebirdelectronics.com.au/) |
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# 11 Future requirements

The final step is to identify and document future requirements of the project.

The project scenario already gives you some background information about potential future requirements.

Talk to a stakeholder (or representative) to determine at least **two** different future requirements for the project. 20 -50 words MAX

#### What are future requirements for the project? Name at least two different requirements.

Future requirements would involve adding capability for the prototype to connect to mobile phone and or smart watch and to enable muti user tracking/data collection on users. The follow me function needs to be extensibale so that more users can be added

# Appendix 1: Template Instructions

Some basic instructions on using this template.

These instructions include:

* Updating the costing table.
* Adding references, and
* What to do **before** submitting the assessment.

## Updating the Costing Table

In the 10 Prototype Base Costing table, you may need to add rows. To add rows:

1. Select the row above the Total.
2. Right mouse button
3. Click Insert Row Below.
4. Copy the last cell (total) of the row above into the new last blank cell.

Once the table is complete, you must update the totals. To update each total:

1. Right mouse click on the total.
2. Select Update Field.

Totals recalculate automatically by using these steps.

## Updating Table of Contents

To update the table of contents, follow these instructions.

1. Go to second page, this has the table of contents.
2. Click on the Table of Contents heading.
3. At the top click “Update Table”
4. When it asks, click update the whole table.

# Appendix B: Before Submission

Before you submit the assessment:

1. Ensure you have completed all the steps and answered all questions in the assessment task.
2. Then update the Table of Contents
3. Update the Costing Tables in the Commercial Costings and Prototype Costing sections.
4. Save this document as per instructions in the assessment task.

Once all the above is completed then you are able to submit the work for assessment.