You are to conduct a research assignment to collect, process, display, and interpret data.

# Part 1: Formulating a research question

Identify the aim of your research and formulate a research question.

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| The aim is to find the RSSI (Signal Strength) Of School Wi-Fi Networks around the school.  The Question we will be asking is, what is the WIFI Signal strength around the school, what needs upgrades and where is best. |

Describe what type of research you are going to conduct - make a selection from the categories below:

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| Exploratory – We are going to figure out what part of the school needs WI-Fi Upgrades (In Signal Strength.) However, it may be classed as comparative seeing that our datapoints are compared against each other. |

*a. Test a hypothesis - you make a prediction about what will happen in an experiment. Your hypothesis will be proven true or false by the results of your experiment.*

*b. Exploratory research - this will take place in an area of research where little is known. Your research will produce results that can be analysed, and used to produce a hypothesis*

*c. Comparative research - your research will compare groups to identify differences, similarities and patterns.*

Explain why you have chosen this area of research.

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| I have had Wi-Fi Issues and would like them solved, this research could lead to the upgrade of Wi-Fi equipment throughout the school, leading to a better experience for students, especially those with laptops that are older and don’t support Wi-Fi as well. |

Describe who could benefit from the results of your research and how.

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| The Whole school could be improved by better internet connections but as I stated above, people with older laptops would benefit the most. |

# Part 2: Data Collection Method

What method will you use to collect data for your research? You need to detail it in this section. There are 3 methods that you can choose from:

1. Survey data - online survey or in person survey

2. Data collection method

3. API - collect real time data or use an API to access an existing data set.

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| I will use a micro-controller using custom code (Digi-ESP-Assignment.ino) to log datapoints of RSSI values around the school (Using Assignment\_ESP.py) and process it in python (With Data\_Processing.py to average values and Graphing.py to graph them) before drawing conclusions using the graphs I create with graphing.py. |

**Participants/Subjects:** Describe the characteristics of the participants or subjects from whom you will collect data (e.g., demographics, sample size, selection criteria).

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**Instruments/Tools:** Explain the tools, instruments, or materials you will use to collect data. This could include surveys, questionnaires, interviews, observations, sensors, or software.

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| My Software Uses a Micro-Controller called an ESP-32 to log the RSSI (Received Signal Strength Index) of local Wi-Fi networks, print it over serial to my computer which logs it with the Python Script “/Assignment/Assignment\_ESP.py” on the Assignment branch of [My Github.](https://github.com/DefeatedWarrior/SchoolPython/tree/Assignment/Assignment) |

**Procedure:** Provide a step-by-step description of how you will carry out the data collection. Include details on how you will approach participants, the order of activities, the timing of data collection, and any instructions or scripts you will use.

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| To Collect the data for this assignment, I go to a classroom and connect my ESP32. I then run my Python script and follow the prompts, (Being Room Number, Port and Network Name) after about 30 Seconds it Saves it to a Data.CSV. |

**Variables:** Specify the variables you will measure or observe. For quantitative research, detail the measurement scales and units. For qualitative research, describe the aspects you'll be exploring.

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| Wi-Fi RSSI (Received signal strength index), WIFI BSSID (WIFI Name) and Room Number. |

**Data Handling:** Explain how you will handle the collected data, including how you'll organize, store, and manage it securely.

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| I will save my CSV to an online Data Storage website as a backup and being that the data is not confidential it can be kept unencrypted without the problem of leaking user data (due to anyone being able to collect this data.) |

# Part 3: Conduct research

You will have time in class to carry out your research. You need to record and store data, as outlined above. You should submit your data in the form of a spreadsheet or text file.

# Part 4: Data representation

Use pygal to create a range of charts to represent the data you have collected. Explain why you have chosen the charts. You will be required to submit the charts as images embedded in the space below and the code that generates the images.

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| The code can be found on Drum roll please, [My GITHUB!!!!](https://github.com/DefeatedWarrior/SchoolPython/tree/Assignment/Assignment)  (As Well as the images) |

# Part 5: Interpretation

Interpret the data that you have recorded by:

* Precisely describing any trends in your data.
* Discussing why you think any trends exist
* Discussing the possible impacts and implications of your research
* Identifying directions for further research in your chosen area

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| There were no real trends in the data, aside from the classes without routers, this makes it seem to me as if the school, from the classes I have surveyed, were decent. The library was very good, in fact it was the best that I surveyed aside from the makerspace which happened to be one of the worst surveyed. The trends head towards classes without routers only having slightly worse RSSI.  RSSI is not the only important factor in Wi-Fi analysis as throughput and stability are also important.  If throughput is not great, Wi-Fi will seem slow and if stability is a concern, Wi-Fi will randomly disconnect. However, the school Wi-Fi seems to be acceptable.  However, as an estimate, I feel the gym and PAC along with the demountable need to be surveyed and reported on as most issues happen there.  Looking at line charts, the Wi-Fi seems to wax and Wayne in signal strength. |