



## PEAT

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# An Analysis of Geographic Information System for Wi-Fi Coverage at Block A1, UTHM Pagoh

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**Abstract:** Geographical Information System (GIS) is a computer-based information system which digitally records and analyzes geographic elements on the earth's surface based on Tobler's first law of geography. This study's objective is to analyze the existing Wi-Fi location at the campus area. Followed by, to study problems of Wi-Fi coverage at campus and to determine the location with highest Wi-Fi coverage at the campus area. Data regarding the wi-fi installation in Block A1 were collected from Information Communication Technology (ICT) department of the campus and then a visual survey was conducted among students in order to gain information about the speed of wi-fi modem located inside Block A1, UTHM Pagoh. An Entity Diagram (ER-Diagram) was illustrated, and an attribute data was created for Block A1. All the data collected were digitized and analyzed using QGIS software. As a result, a suitable location with optimum network coverage inside Block A1 was discovered.

**Keywords:** Geographical Information System (GIS), Optimum Network Coverage

## 1. Introduction

A map is a visual depiction of the relative placements of items in a location or region. It depicts numerous elements of an area using a variety of colours and symbols. Maps are usually classified according to their intended usage. General-purpose maps or reference maps display both natural and man-made elements such as lakes, rivers, highways and buildings. The most frequent approach of locating a desired location or position in a particular area is to use a map. Information such as street names, symbols and the nearest markers to the desired region can now be assessed. It is beneficial in avoiding issues such as traffic congestion and long journeys.

### 1.1 Geographical Information System (GIS)

A Geographic Information System (GIS) is a set of computer hardware, software and as well as humans that allows users to enter, manipulate, analyze and present data and information about a specific area on the earth's surface. Furthermore, a Geographic Information System (GIS) is a computerized

information management system for managing, processing, analyzing and creating data related to spatial and aspect relationships. In addition, GIS can be used in multitude of fields including research, engineering, construction, local authorities, social, national defence and military operations. Cartography, computer assisted design (CAD) and computer graphics, surveying and photogrammetry, spatial analysis, spatial modelling and remote sensing are all examples of GIS sources. Geographic Information System (GIS) is a term that is commonly used to represent spatially oriented computer technologies and integrated systems that are utilized in real-world applications. GIS may be classified into several categories of applications. Moreover, Geographic Information System (GIS) is also known as a computer application which allows users to create, save, view, manipulate and analyze geographic data. Furthermore, the strongest disciplines in which GIS looks to be most effective include resource management, utility management, telecommunications, urban and regional planning, vehicle routing and parcel delivery as well as any research involving the earth's surface. GIS is also defined as a system which manages all aspects of geographic data collection, storage, analysis, query, display and output by combining computer hardware, software, geographic data, procedures and people. Furthermore, the five most common GIS functions are data collecting, data structure, data modification, data analysis and data display. GIS is a useful tool for managing complicated works as well as integrating hardware, software and data for data collection.

## **2. Materials and Methods**

### **2.1 Materials**

The materials needed and used in this research are QGIS software, digital map of UTHM Pagoh campus and floor plans of Block A1. A preliminary study was conducted in first place in order to start up the analysis process and the preliminary study was collecting relevant data collection for the project such as location and units of wi-fi modem installed inside Block A1, digital map of UHM Pagoh, floor plans of Block A1 and QGIS software. QGIS software is important to digitize and analyze all of the data collected whereas digital map of UTHM Pagoh is essential to create a detailed database in QGIS software. Database is a significant part in QGIS software to enhance the analysis output. Last but not least, floor plans of Block A1 is vital to create spatial layers in QGIS software as spatial layers helps to identify the location with highest network coverage inside Block A1 precisely.

### **2.2 Methodology**

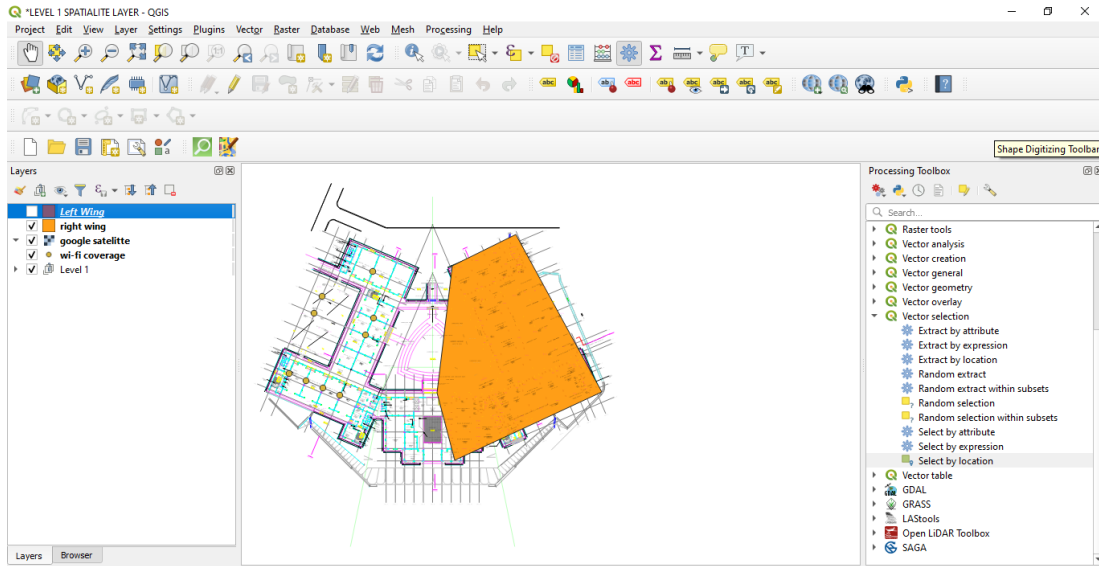
The QGIS program is the principal tool used in this study. All the information and statistics on the network connection utilized in the current study area were collected from the campus's Information Communication Technology (ICT) department. Moreover, additional data such as digital map of UTHM Pagoh and floor plan layouts of Block A1 also were collected. With all of the data collected from respective sources, a visual survey was conducted among students to obtain information regarding the speed of wi-fi installed inside Block A1 by distributing Google Form. Consequently, an Entity Diagram (ER-Diagram) which contains information such as type of wi-fi, name of wi-fi, level, wing, faculty and unit of wi-fi installed inside Block A1 was illustrated. Also, an attribute table was also created for Block A1 to make the analysis process easier and faster. All of the information and data was then entered into the QGIS software, and the data were analyzed and digitized. A suitable location with optimum network coverage inside Block A1 was discovered at the end of this study.

## **3. Results and Discussion**

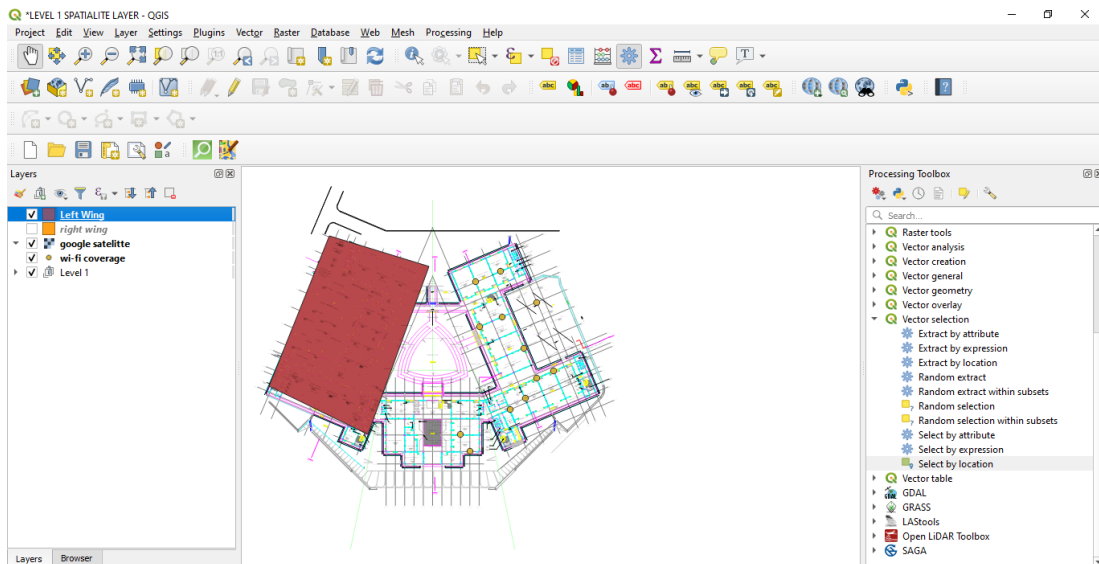
The plan layouts of Block A1 was digitized and analyzed using QGIS software. The data was imported into the software and attribute data table was created. The results of the analysis are shown below.

### 3.1 Results

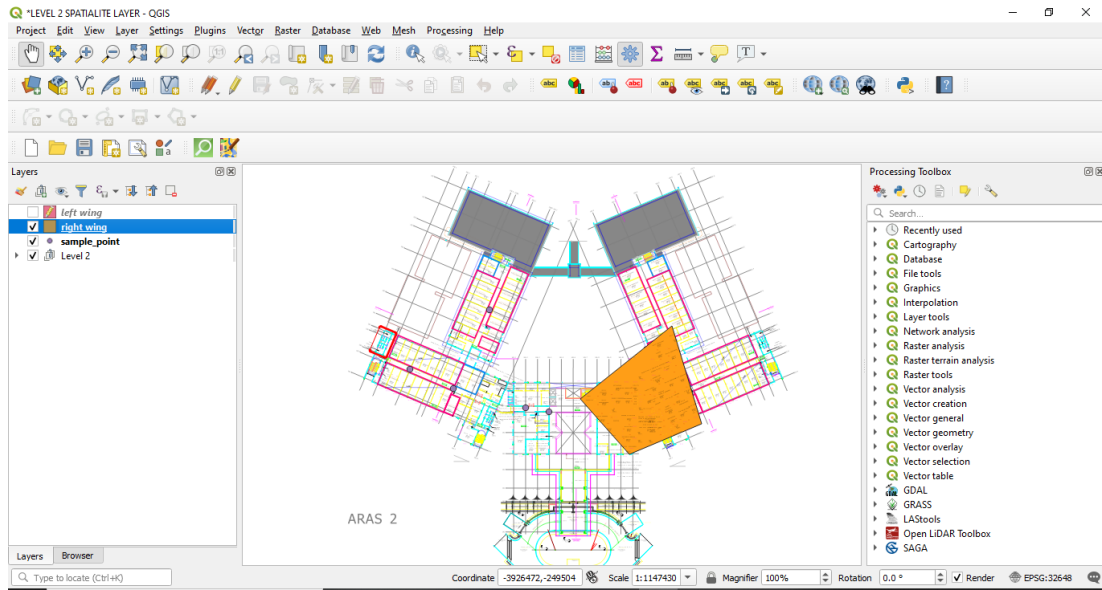
As a result, the database for wi-fi coverage identification has been completely analyzed by QGIS software. The database consists of layers and attribute tables can be shown on the map created. After that, the results are generated. Figure 1 until Figure 9 shows the output results of the database analysis of Geographic Information System for wi-fi coverage inside Block A1, UTHM Pagoh.



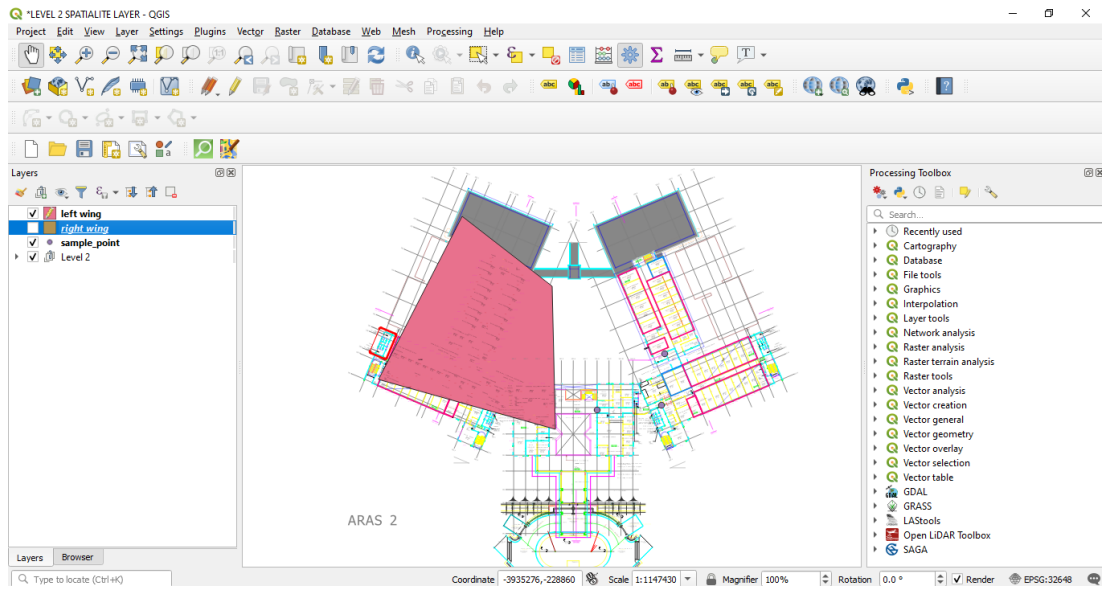
**Figure 1 : Wi-Fi Coverage at Left Wing of Level 1**



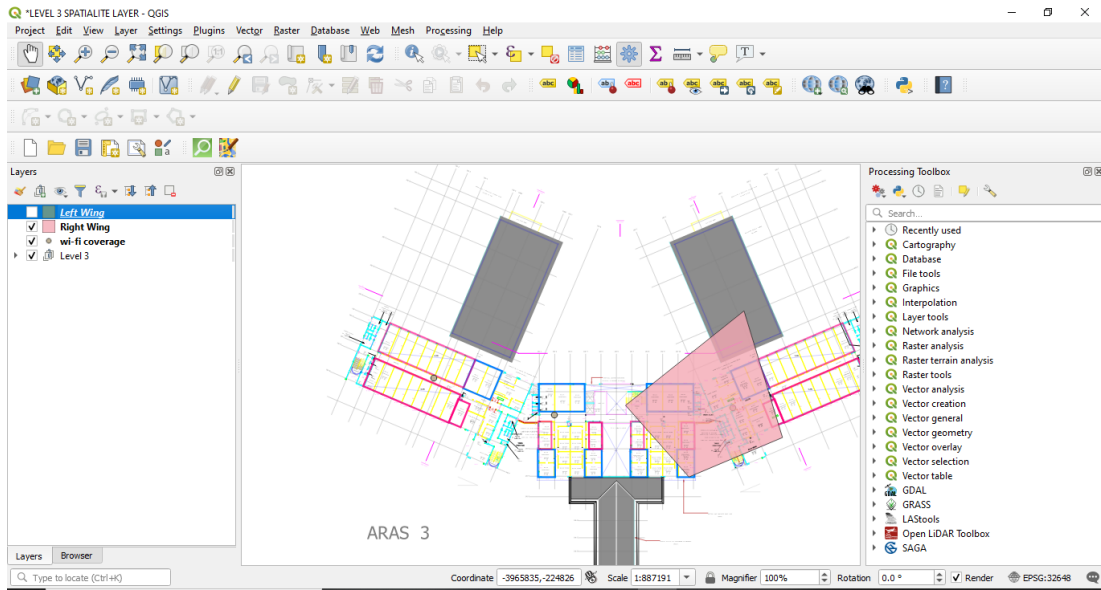
**Figure 2 : Wi-Fi Coverage at Right Wing of Level 1**



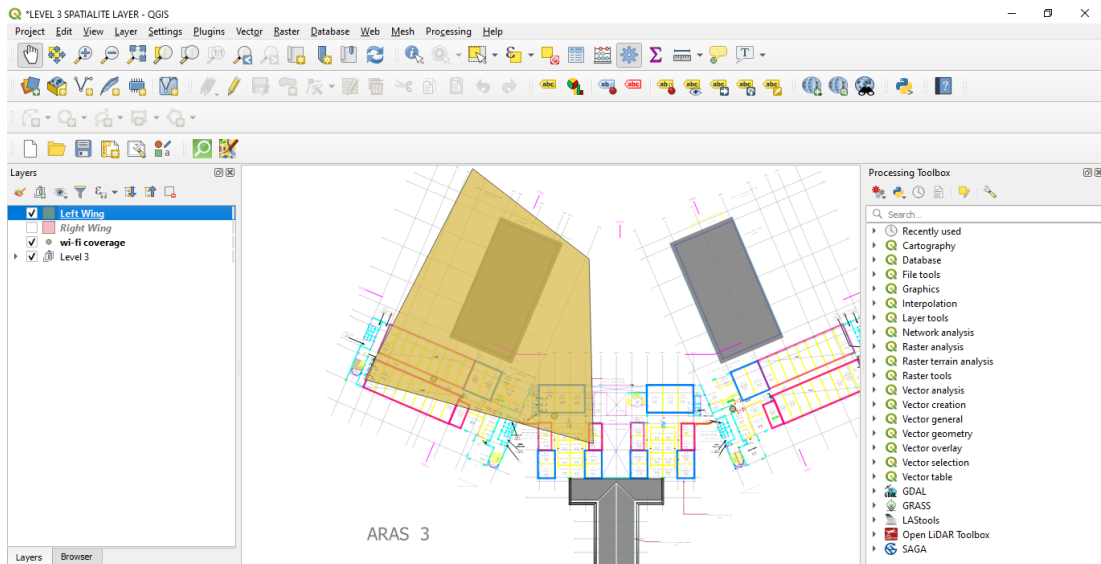
**Figure 3 : Wi-Fi Coverage at Left Wing of Level 2**



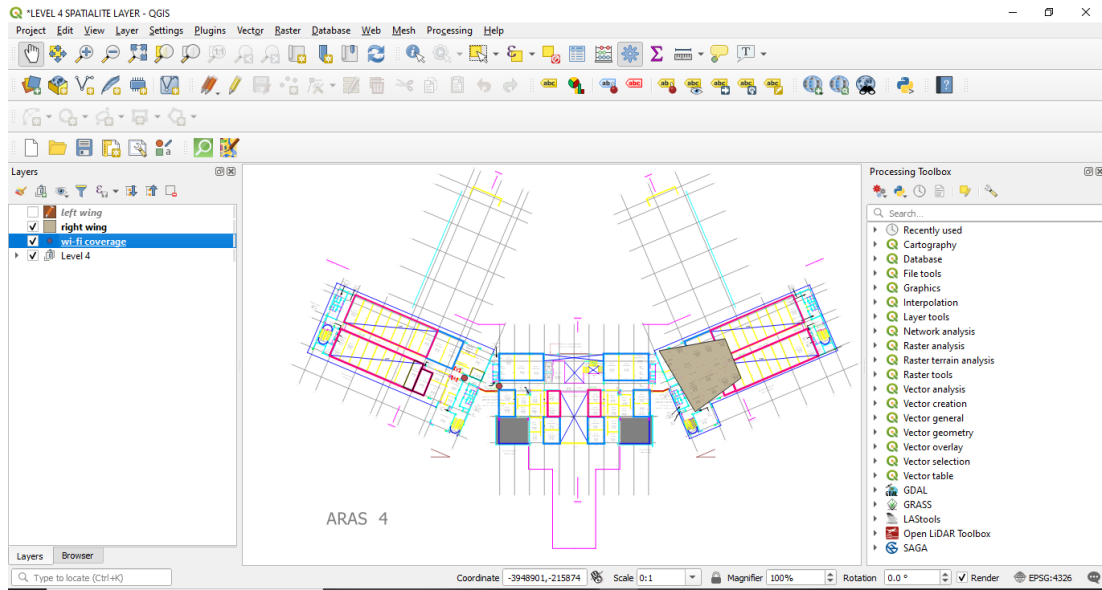
**Figure 4 : Wi-Fi Coverage at Right Wing of Level 2**



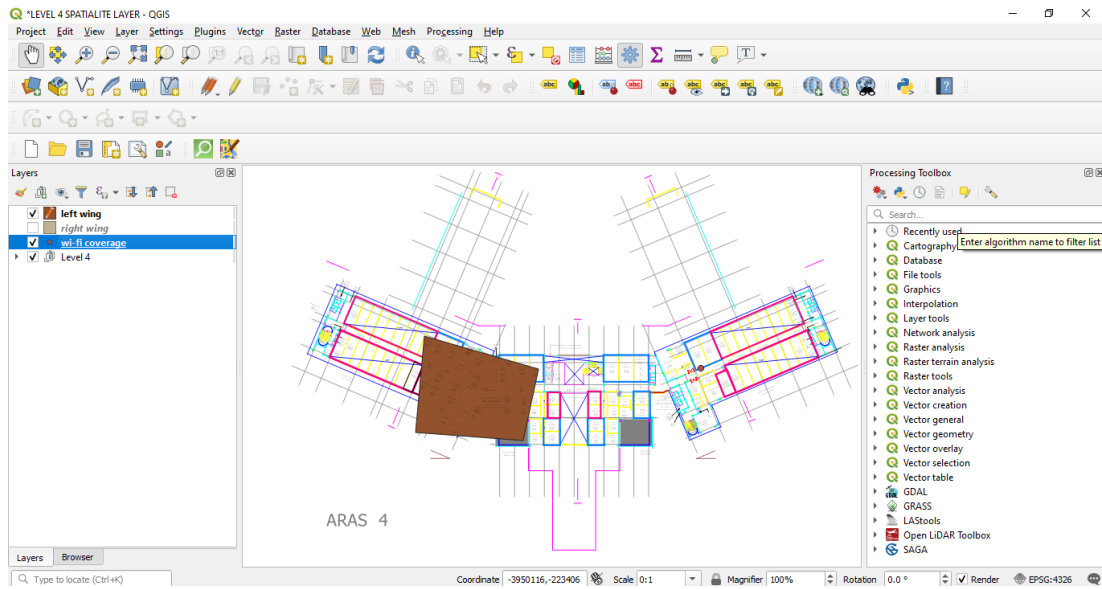
**Figure 5 : Wi-Fi Coverage at Left Wing of Level 3**



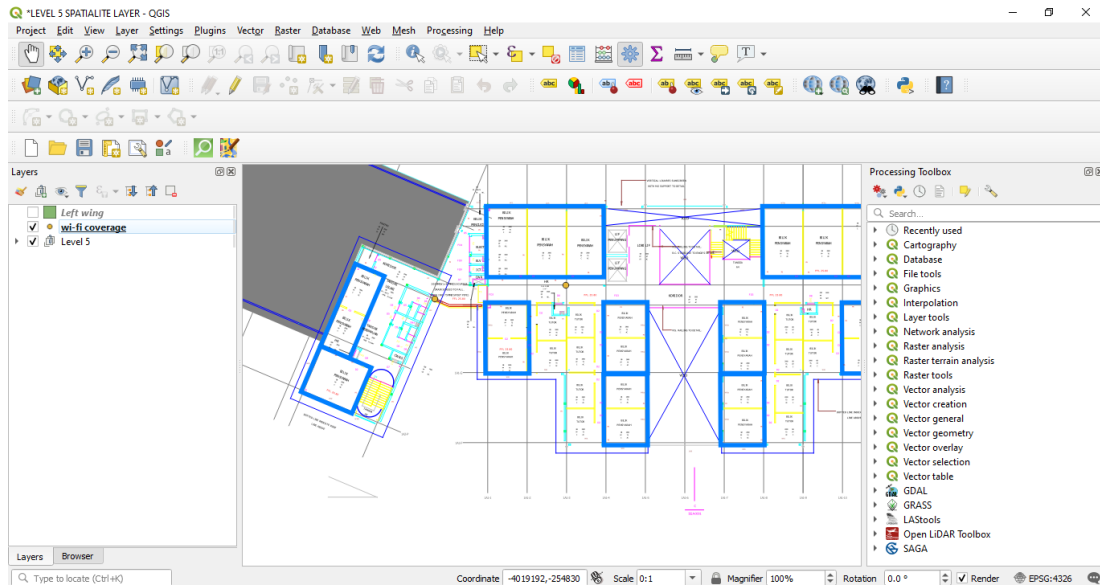
**Figure 6 : Wi-Fi Coverage at Right Wing of Level 3**



**Figure 7 : Wi-Fi Coverage at Left Wing of Level 4**



**Figure 8 : Wi-Fi Coverage at Right Wing of Level 4**



**Figure 9 : Wi-Fi Coverage at Left Wing of Level 5**

### 3.2 Discussions

This study purposes to digitize and analyze a geographic information system (GIS) database for wi-fi coverage at Block A1, UTHM Pagoh. The problem that arises for this study is the low coverage of wi-fi at Block A1. The database was completely analyzed using QGIS software. There are several steps which needed to be taken to complete the analysis process of database such as data collection, database design, database testing and database analysis. Based on the output results of analysis shown in Figure 1 until Figure 9, it is clearly displayed that the wi-fi coverage is highest at level 1 both in left and right wing of Block A1 as per demonstrated in Figure 1 and Figure 2. Hence, students can certainly use level 1 of Block A1 to access wi-fi with highest coverage to complete their tasks and assignments.

### 4. Conclusion

The outcome of this study has shown that the location with highest wi-fi coverage in Block A1 is level 1 both left and right wing. Moreover, based on the visual survey conducted among students, the problems of wi-fi coverage at Block A1 was able to investigate properly. Based on the data collected regarding wi-fi installation inside Block A1, the speed of wi-fi was able to analyze perfectly. Hence, it can be concluded that the objectives of this study are achieved.

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