SCHOOL OF COMPUTING
Faculty of Engineering

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SECP1513 - 01

(TECHNOLOGY AND INFORMATION SYSTEM)

TITLE: LOW FIDELITY PROTOTYPE (PART 2)

Group 5

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Submitted to:

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1.0 Introduction

As we know in the post COVID-19 world, a lot has changed to prevent the spread of the disease. This includes the educational sector, as educational institutions start to implement online distance learning or ODL as a new learning method. As everything is now in an online based manner, many teachers and students faced multiple problems to fully comprehend this new norm. This is where our app “AlphaBi” comes in as the new solution for this problem. With the help of cloud computing, which is one of the 4th Industrial Revolution technologies, it helps us to build our app perfectly as cloud computing provides the on-demand availability of computer system resources, particularly data storage (cloud storage) and computational power, without the need for the user to actively manage them. Cloud computing also relies on resource sharing to achieve coherence and economies of scale, often through a "pay-as-you-go" approach, which can assist in reducing our capital costs while potentially exposing customers to unanticipated running costs. This approach will benefit the user and also us as the creator.

2.0 Description (video, image, brainstorming, journal, progress) - problem, solution, team working

LOGO SAMPLE

OUR FINAL LOGO

Problem

We faced many challenges to satisfy our client request as we tried to understand their demand, the need and try to figure out the outcome itself. However, we managed to build one specific software tool that can complete all the requirements needed by students and lecturers of a bioinformatics course.

Solution

We summarize all on-demand tools for bioinformatics course students which are some popular softwares such as NetSurfP, NetTurnP, MODELLER, AutoDock, Gromacs, Deeds, Code Blocks and OrfPredictor in one software. The software platform is designed to teach bioinformatics concepts and methods including Rosalind and online courses offered through the

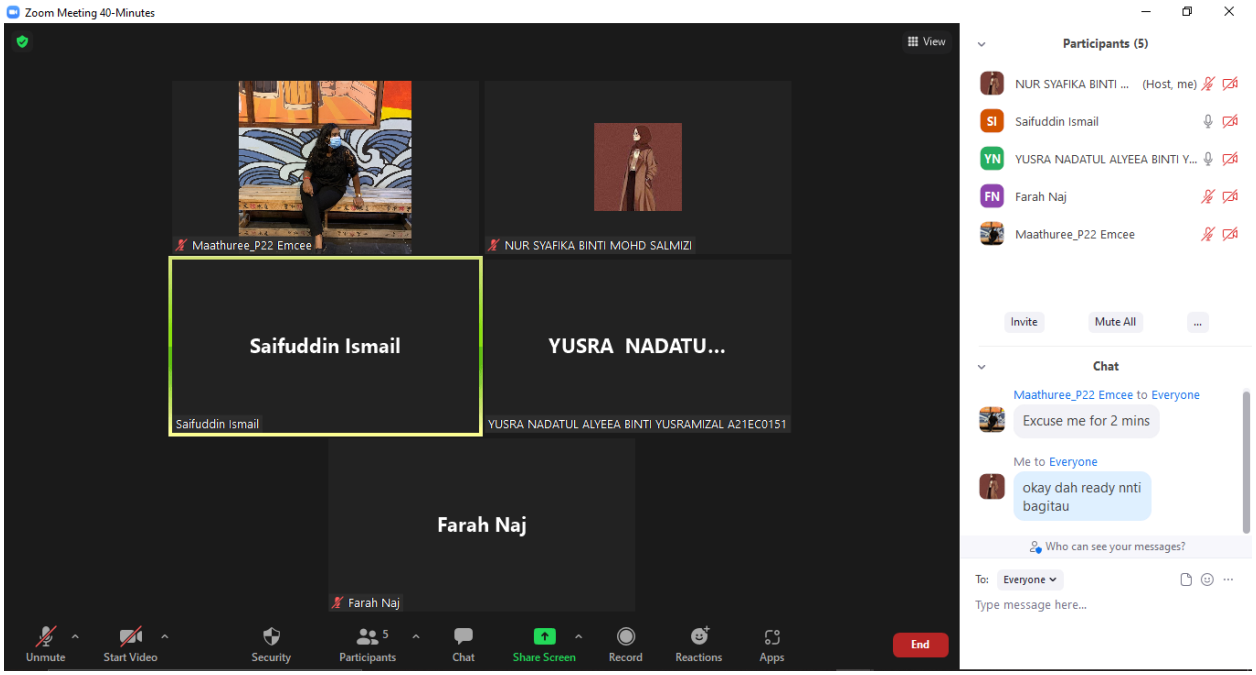
Swiss Bioinformatics Institute, videos and slides from the Canadian Bioinformatics Workshop and other related bioinformatics courses as much as all important things needed in Bioinformatics course will be compiled under one platform so called ‘one-for-all’ site.

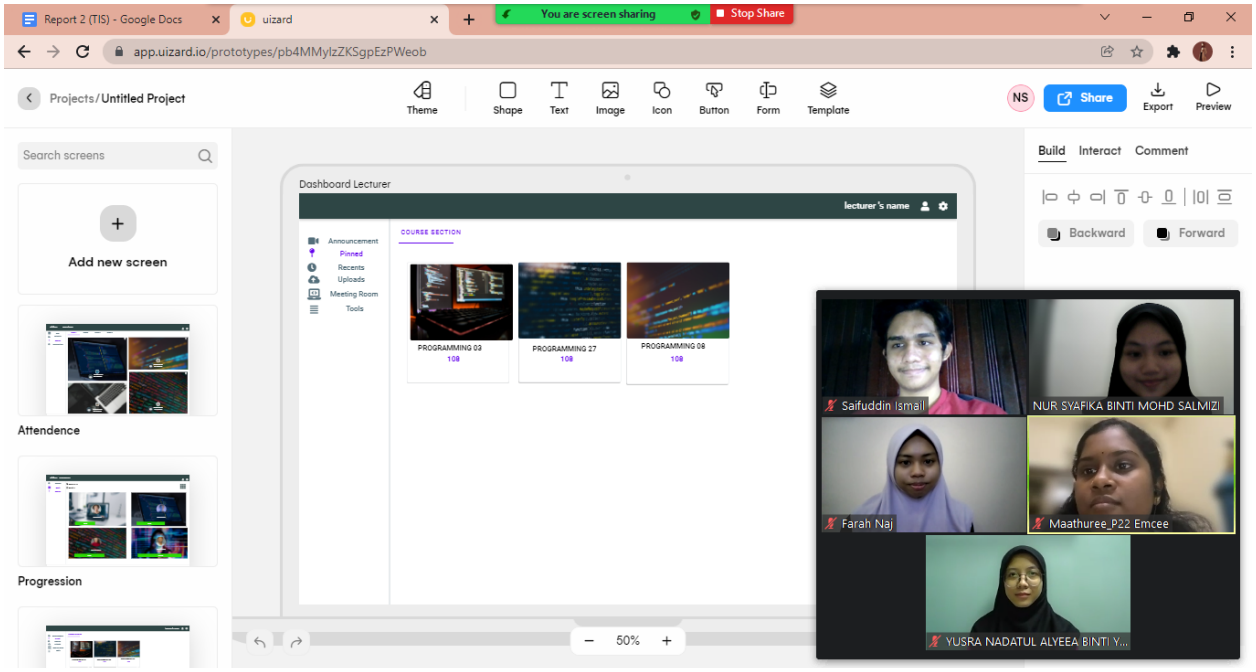
Teamworking

Along with the brainstorming and ideas given by each groupmate, we started deciding to give separated tasks. Firstly, we tried to understand the main purpose of the project and then we did data collecting and analyzed what we should include in the software. Then decide what we should use for software and start collecting data from many sources.

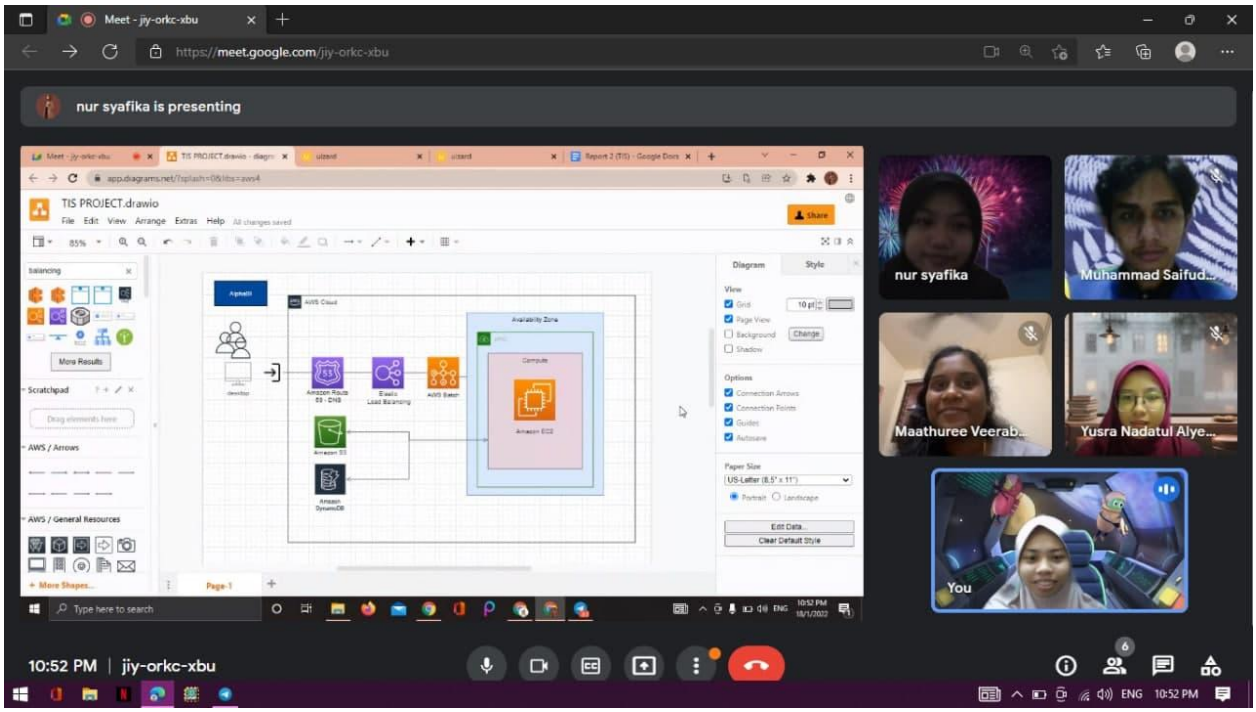
Then, we started to visualize sketches and diagrams with explanations. It helps us to define and analyze each process.

We also did a google meeting to discuss further about the cost of our project and to find future investors to fund our project. We also discuss our future market and how to successfully reach the market as we try to find the perfect marketing strategy to make sure our app becomes a household name in the educational sector.

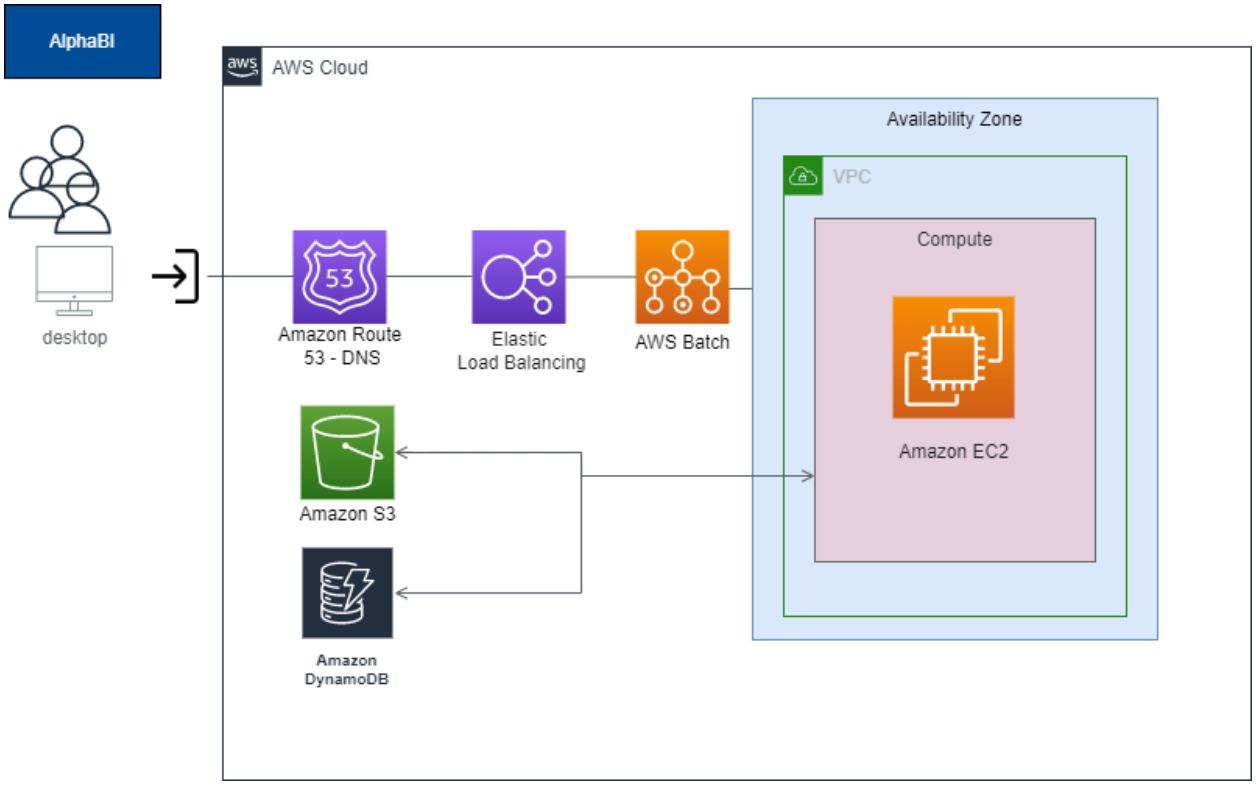




The next progress for our project is we discuss the design of AWS architecture.



3.0 AWS Architecture Design



We named this software platform 'AlphaBI'. The word alpha means to have the highest position in the hierarchy of mastery while BI is taken from the word bioinformatics itself. Therefore, this software is mainly focused on bioinformatics students and lecturers because many applications in this software are about learning and teaching subjects related to computer science bioinformatics.

The cloud computing we use is Amazon Web Services (AWS) because AWS has more services and more features in the service than any other cloud provider such as infrastructure technologies like computing, storage and databases. There are also emerging technologies like machine learning, artificial intelligence, data and analytics and the Internet of Things (IoT) in AWS. This makes it faster, easier and more cost-effective for us to move from the existing apps to the cloud and build almost anything we want to build.

In terms of the network of our software platform, we use Virtual Private Cloud (VPC) as VPC will establishes a separate virtual network environment for our AWS account to provide cloud services, other AWS resources and services run inside VPC networks to surely provide us with the software we need to create this platform without the need of high end computer. A VPC is similar to a typical TCP/IP network in that it may be grown and expanded as needed without the hassle of running a physical data center. VPC allows us to quickly create a virtual network

architecture into which AWS instances can be deployed in which each of VPC specifies the requirements for our AWS that are IP address, subnets, routing, security and networking functionality. Multiple VPCs can be hosted by a single Amazon account. Because VPCs are self-contained, we can duplicate private subnets between them in the same manner that we could use the same subnet in two distinct physical data centers. We can also specify public IP addresses that can be used to connect to VPC-launched instances through the internet. Because of this feature, it allows us to create the program much faster and at the same time prevent the project data from being leaked or stolen.

For the storage, Amazon S3 was chosen as Amazon S3's administration tools can be used to optimize, organize, and configure data access to meet our specific business, organizational, and compliance needs. The S3 offers industry-leading scalability, data availability, security, and performance that meet our demand to create the software platform. For a variety of use scenarios, including data lakes, websites, mobile applications, backup and restore, archive, business applications, IoT devices, and big data analytics, Amazon S3 can store and preserve any quantity of data and make sure the software platform can run smoothly even if any problem occurs .The main reason why we choose Amazon S3 was because of the abundance of feature that are storage classes, storage management, access management, data processing, storage logging and monitoring, analytics and insights, and strong consistency. This feature allows us as developers to create the software with more ease and neatly maintain the platform software from having crashes or bugs.

In the database system of our software platform, we use Amazon DynamoDB. It is a fully managed NoSQL database service that provides fast and predictable performance with seamless scalability. DynamoDB allows us to unload the administrative load to operate and scale a distributed database so that we no longer have to worry about hardware allocation, setup and configuration, replication, software patching or batch scaling. DynamoDB also offers encryption at rest, which eliminates the operational burden and complexity involved in protecting sensitive data. DynamoDB can improve performance and scalability as it gives us the ability to auto-scale by tracking our usage distance to the upper boundary. This can allow our system to adjust according to the amount of data traffic, helping us avoid problems with performance while reducing costs. As mentioned earlier, DynamoDB is a NoSQL database, where items in the same table can have different attributes. This gives us the flexibility to add attributes as our application grows and we also can store newer format items next to older format items in the same table without having to perform a schema migration.

We use Amazon Route 53 as it can link user requests to infrastructure running within AWS such as Amazon EC2, Elastic Load Balancing or Amazon S3 buckets and it can also be used to route users to infrastructure outside of AWS. We can use Amazon Route 53 to configure DNS health levels, then continuously monitor our apps ability to recover from failures and control the recovery of those apps. Amazon Route 53 Traffic Flow makes it easy for us to manage traffic globally through a variety of routing types, including Latency Based Routing, Geo DNS, Geoproximity and Weighted Round Robin which can all be combined with DNS Failover to enable a variety of low latency and error-resistant architectures. By using Amazon Route 53 Traffic Flow's simple visual editor, we can easily manage the way our end users are directed to the endpoints of our application, whether within an AWS region or distributed worldwide.

We use Elastic Load Balancing (ELB) because it automatically distributes incoming application traffic and scales resources to meet traffic demand. ELB helps IT teams adjust capacity according to incoming applications and network traffic. It is very helpful especially when there are too many users using our website at one time as it can maintain consistent application performance.

AWS Batch is used to help us run batch computing workloads on the AWS Cloud. AWS Batch removes undifferentiated heavy loads to configure and manage the required infrastructure, similar to traditional batch computing software. These services can provide resources efficiently in response to submitted work to eliminate capacity constraints, reduce computational costs and deliver results quickly. As a fully managed service, AWS Batch helps us run batch computing workloads at any scale. It also automatically allocates computational resources and optimizes workload distribution based on workload quantity and scale. With AWS Batch, there is no need for us to install or manage batch computing software and we can devote our time to analyzing results and solving problems.

Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in Amazon Web Services Cloud (AWS). Using Amazon EC2 eliminates our need to invest in hardware up front, so we can develop and deploy apps faster. We can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking as well as manage storage. Amazon EC2 allows us to add or subtract to handle changes in needs or surge in popularity, reducing our need to predict traffic.

4.0 Business process flow diagram, description

This software brings a lot of benefits to bioinformatics students in terms of using different types of softwares in one for learning and assignment purposes. Apart from that, this software has tools like meeting rooms, badges, report cards, notes, recorded lecturers, assessment, important dates, assignment purpose softwares and also creates communication between students and lecturers. This app is easily accessed by students for daily classes.

There will be 6 tools displayed in the homescreen. The course subjects also will be displayed in the homescreen. The first tool will be an announcement. This tool will share announcements to the students. The next tool will be a pinned tool which lists down the course subjects registered by the students. The third tool will be Recents. In this tool, students are able to check the badges that they collected, subject notes, recorded lecture videos, assessment list, calendar with important date and a chat box for students to chat with their subject lecturers.

There is also a tool called Uploads. Students can check the recent updates of their lecturers. The fifth tool will be the meeting room. In this tool, students can find all types of meeting rooms such as Zoom, Google Meet, Webex and more which will be used by the lecturers for class purposes. The last will be Tools. Under this tool there will be a lot of softwares will be combined under one software for bioinformatics students to use for their learning and assignment purposes.

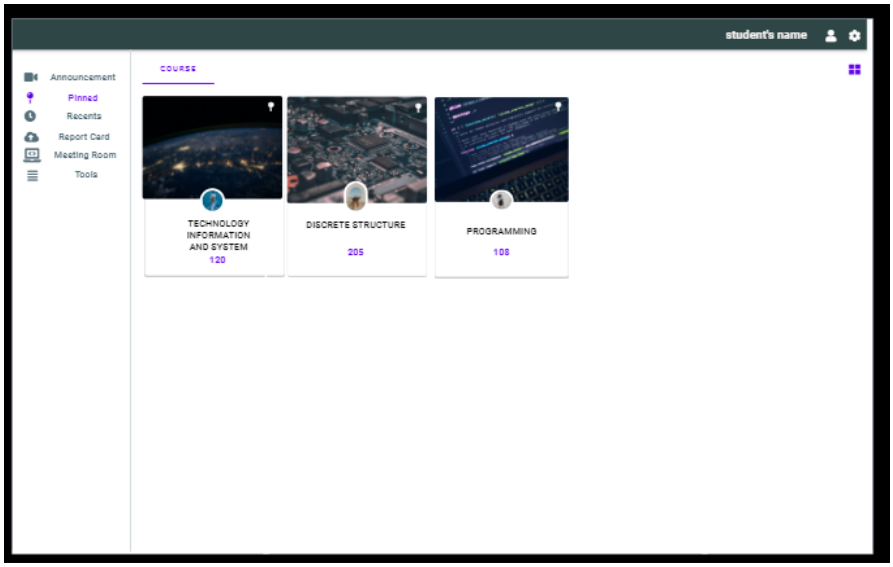
Business Process Flow Diagram

STUDENT

LOGIN

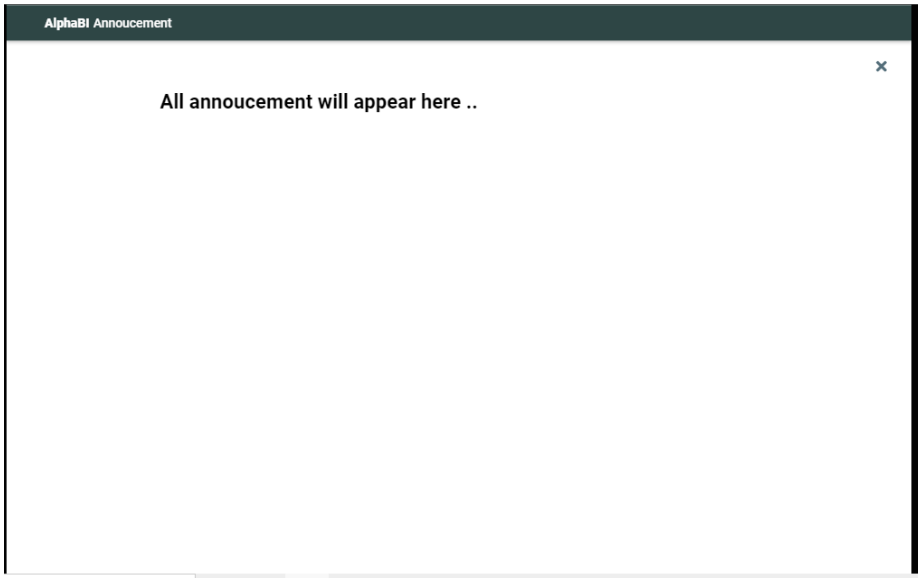
Students have to insert the url https://app.uizard.io/p/7b172c94 to login. Please insert email as the username and insert the password. Choose the option either student or lecturer, then click log in.

MENU AFTER LOGIN



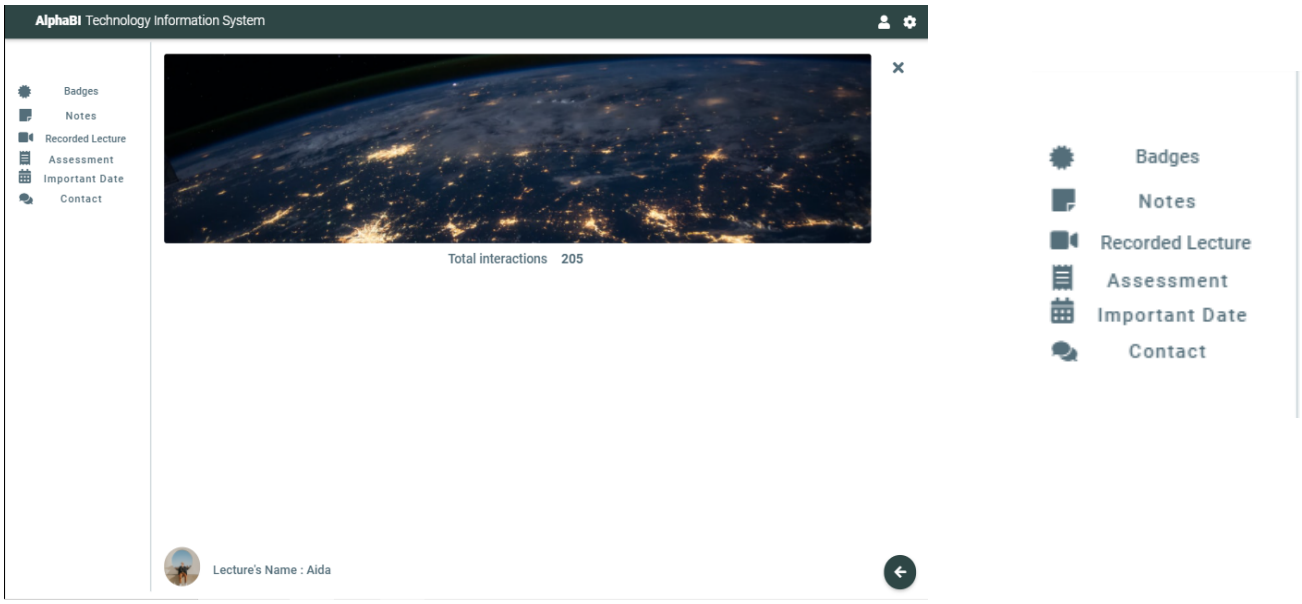
Once logged in, this slide will be displayed. There will be few tools provided for the students to access. The course subjects that are applied by the students will be shown in the pinned page.

ANNOUNCEMENT



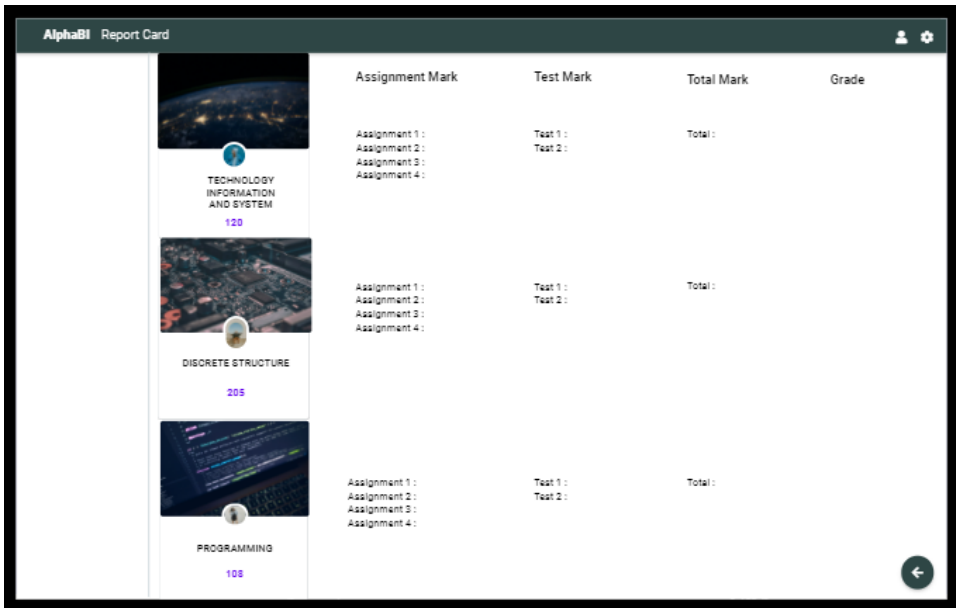
If you click the announcement tool, this slide will be displayed and users can find all the latest announcements here.

RECENT



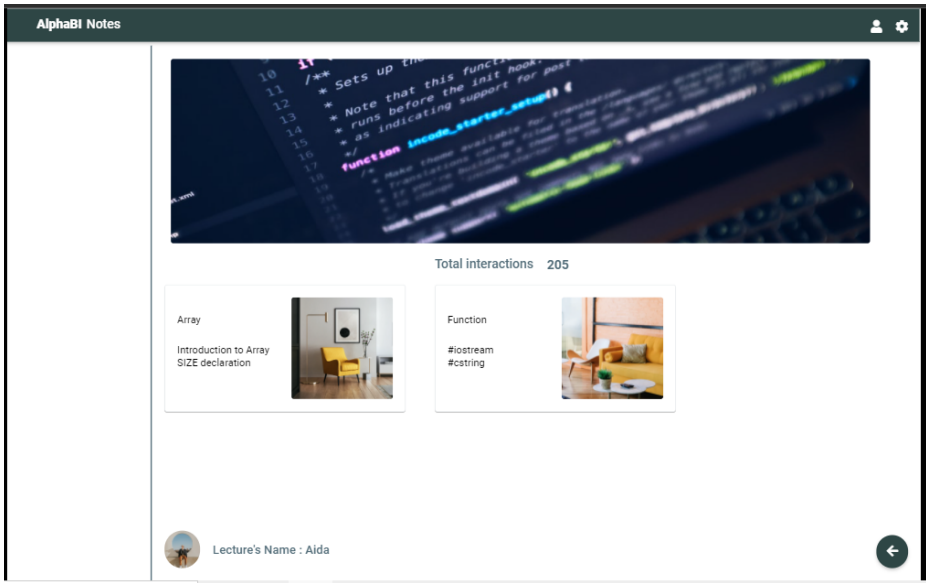
Once users click the 'Recent' tool, this slide will be displayed on the screen. At the left corner, students can find a few other tools.

REPORT CARD



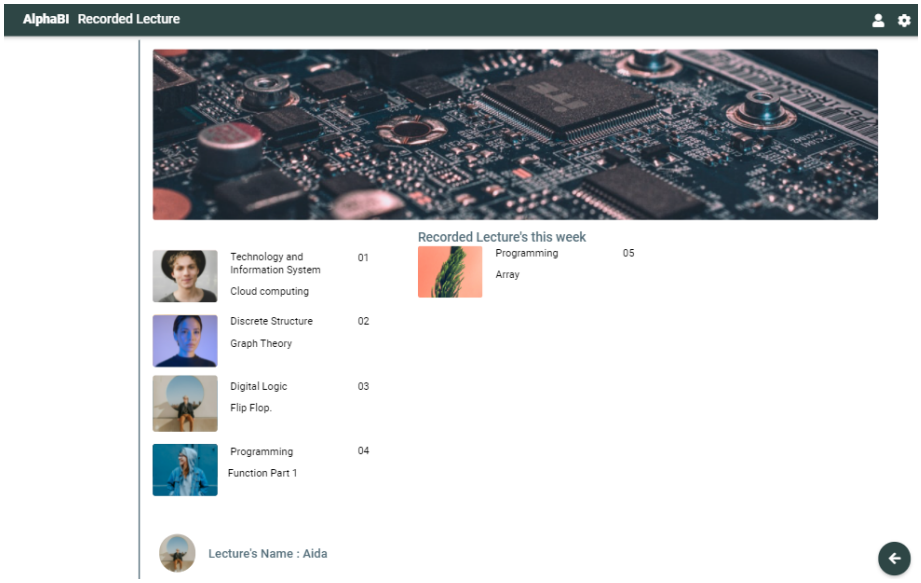
Students can find their marks respectively according to their registered courses in 'Report Card' tool .

NOTES

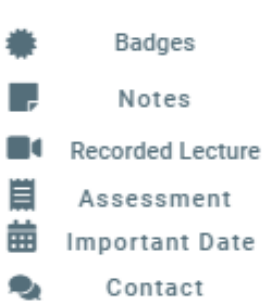


Students can find course subject notes in the Notes tool. All the notes from the lecturers will be uploaded here.

RECORDED LECTURE

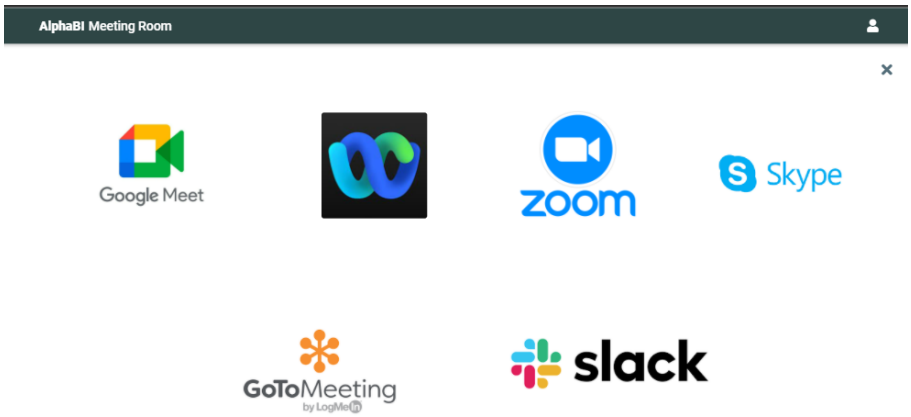


Students can find recorded lectures videos under the Recorded Lecture Tool. All the subject recorded lecture videos will be uploaded here.



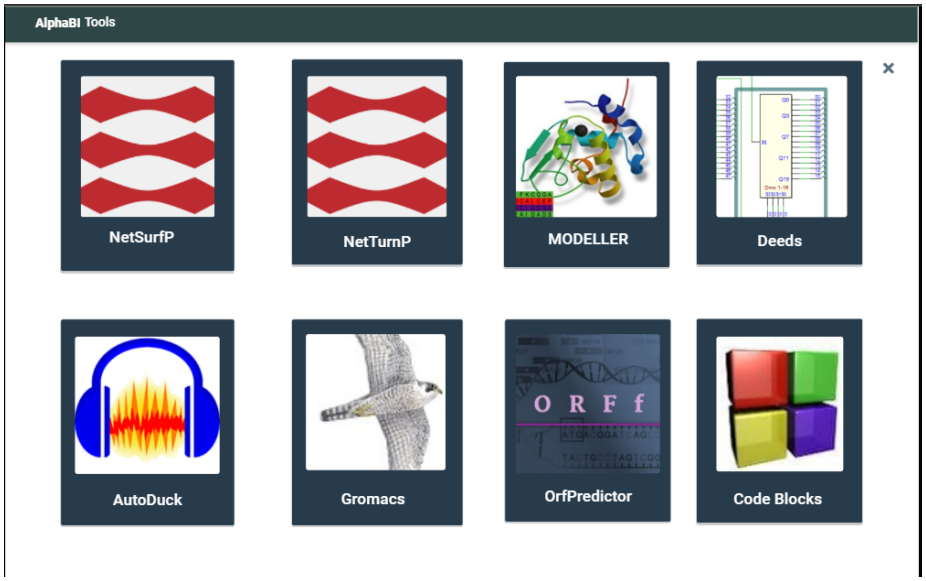
There will be a list of tools at the left panel of the website. Students can check their assessment list and there is also a calendar full of Important Dates. There is also a contact tool for the students to communicate with their subject lecturers.

MEETING APPS



Students can find all types of meeting rooms used by the lecturers under the Meeting Room tool. This tool will be very helpful for students because students don't have to create a new account to use meeting rooms.

TOOLS



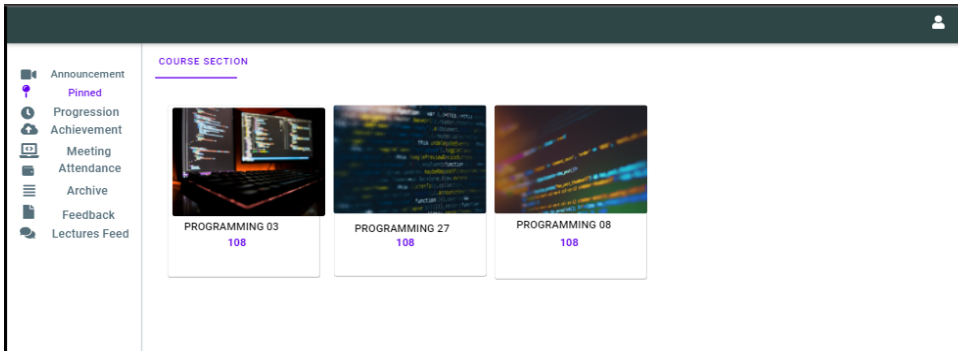
Students also can find different types of software used in bioinformatics courses to do their projects and also for learning purposes.

LECTURER

LOG IN

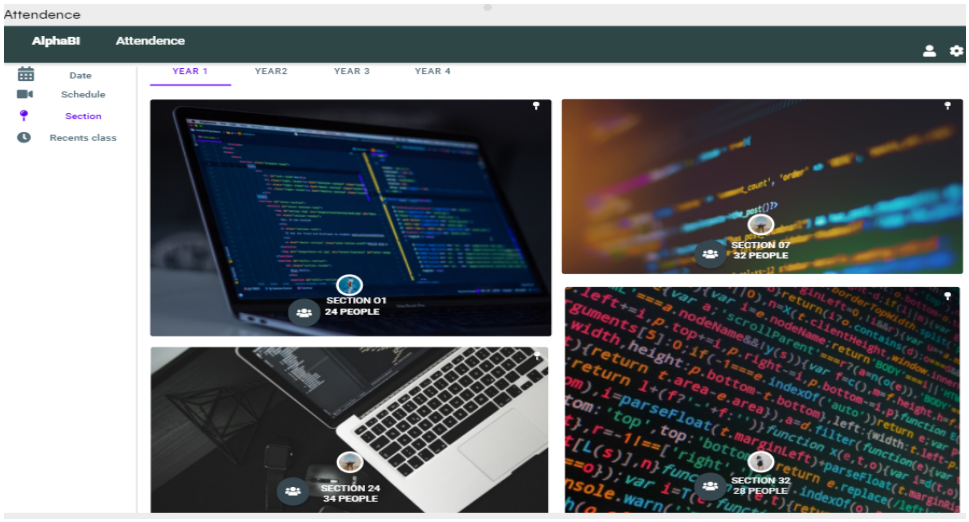
Lecturers have to insert the url https://app.uizard.io/p/ecc469a8 to login. Please insert email as the username and insert the password. Choose the option either student or lecturer, then click log in.

DASHBOARD



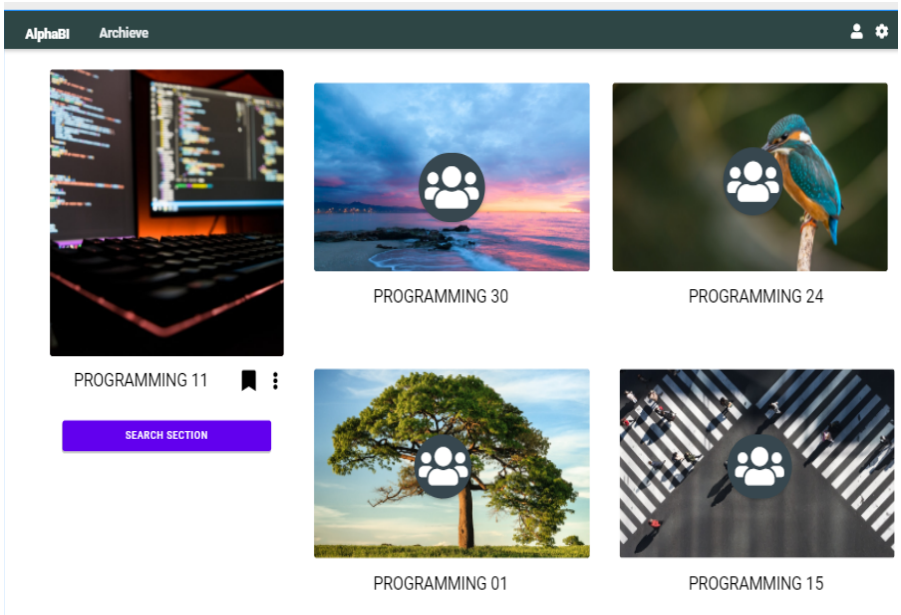
After the user entered the correct password in the log in menu. They brought it to the dashboard where the tools available will be displayed on the left side of the web and the pinned class section will be displayed on the dashboard.

ATTENDANCE



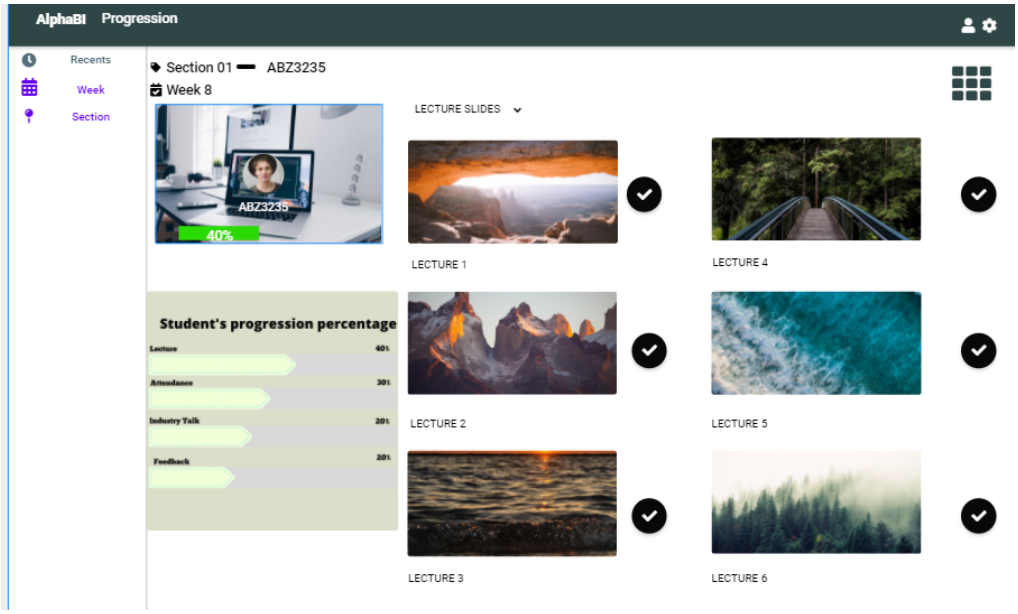
Here the student can choose the section that they want to access that section's attendance list. They also can check their attendance history in every class they register.

ARCHIVE



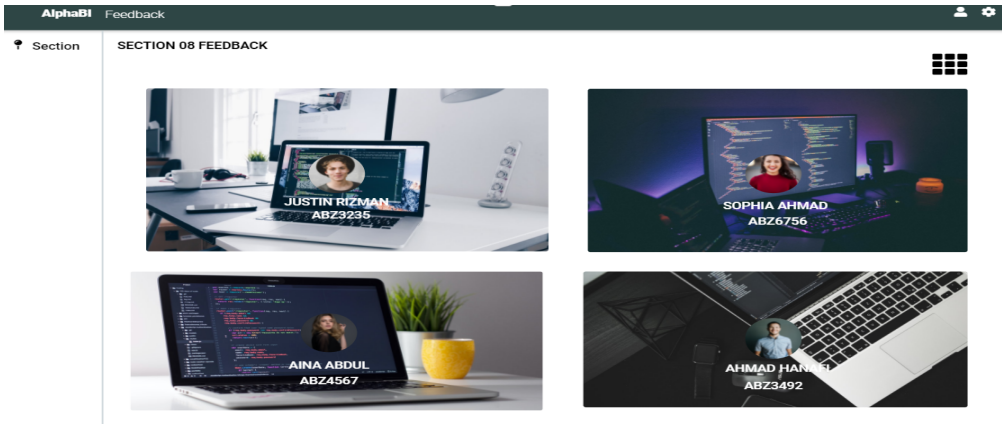
Here is the section where the lecturers can access the old classroom from another batch. They can fetch old files or access the data from the old classroom.

PROGRESSION



In this page, it allows the lecturers to check the progression of their students with the feature that can fill the section and which week the user wants to check their students progression.

FEEDBACK

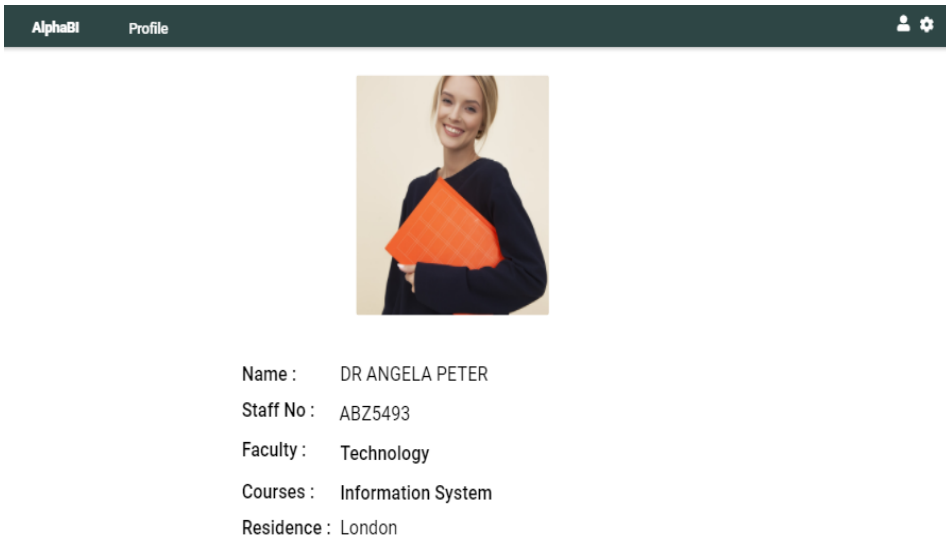


This page allows the lecturers to check each section student's feedback with ease as it filters each section feedback.

ACHIEVEMENT

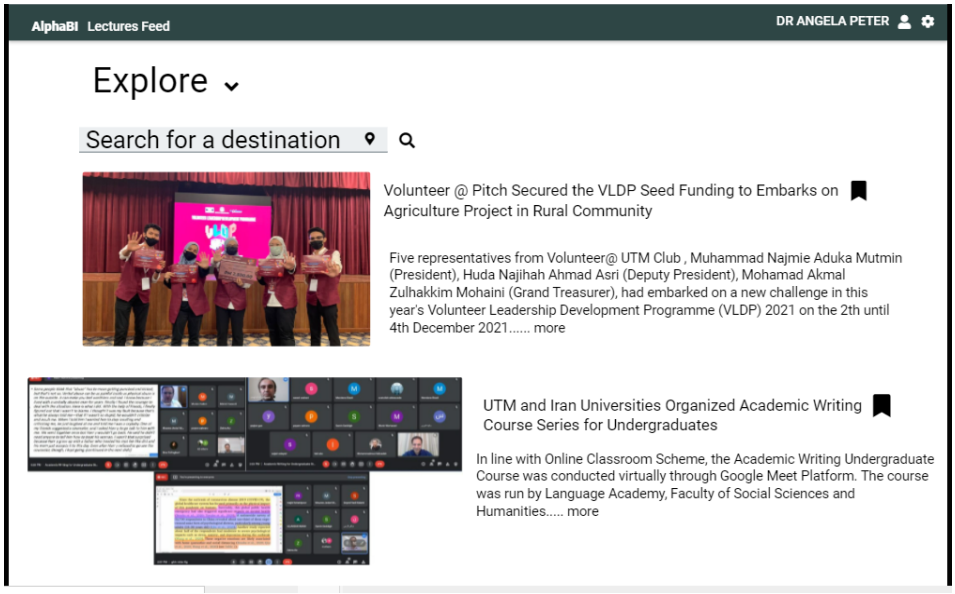
In this page, the lecturer's achievements will be displayed which links to the students course subjects tool. Students are able to get to know their lecturers' achievements which builds inspiration in them.

PROFILE



This page allows the lecturer to fill in the details that they want to display in their profile.

LECTURERS FEED



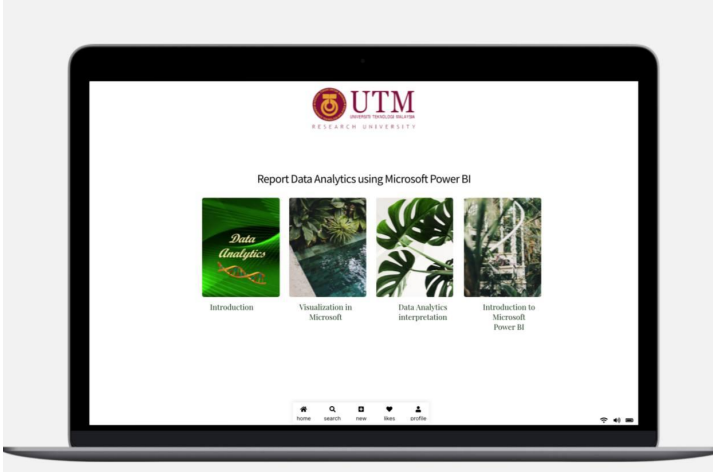
This page allows the lecturer to read the latest news of their universities and they also can upload their feed.

5.0 Low fidelity mockup

We had tried a few low fidelity mockup applications we use Uizard platform to try out the best and easiest form to convey our ideas in the simplest way. Hence, we proceed to explore the software.

Here's our first sketch on low fidelity mockup to clear up the flow of our software.

- https://app.uizard.io/p/da81fbb3



The final sketch for our software looks like this.

- https://app.uizard.io/p/7b172c94
- https://app.uizard.io/p/ecc469a8

There will be several tools for bioinformatics students to use the software in our platform so that it will be easier for them to catch up with their studies. These tools act as one in all solutions for students to complete their studies with ease.

6.0 Reflection (Individual)

1. Farah Nabilah Binti Najmudin

   Throughout the project until the end, I gained a lot of new experiences to learn about cloud computing, aws, mock up and also tried a lot of applications to build new servers and many others. It is an opportunity to gain self knowledge and achieve a better understanding about this topic and for future use. Thus, we faced a few obstacles during completing the project. A big applause to the great teamwork in my team for always teaching, being patient and helping me to complete my task. I enjoyed the time we had in discussion all the time. It's always a fun and helpful session. In the end, this opportunity gave me more excitement and curiosity to explore more about cloud computing and others. I hope that I can gain more knowledge and skills in this field for the future applications in daily life. Special thanks to Dr Azurah for always giving advice and helping us to ensure the success of Project Low Fidelity and also in this course.

2. Muhammad Saifuddin Bin Ismail

   Throughout the journey of completing this project, I have learned a lot of new knowledge and experience that make me become wiser than before.Prior to the making of this project, I gained a lot of new information about cloud computing and about business marketing to the masses. This project journey is not smooth as it seen as ,we were pack with assignment and personal issues but we successfully managed to with the time to finish this project as a team .I wish for our project will gain it recognition and we will be able to improve it to become one of the necessities to the educational sector.

3. Maathuree A/P Veerabalan

   This project has brought up a huge positive impact to me. I have gained so much knowledge in terms of planning and also designing software. It also helps me to gain knowledge in the use of cloud computing deeper. This knowledge helps me to carry out many cloud computing projects. In this process, I had cleared my doubts related to cloud computing which gave me a clear picture of what it is really about. By completing this whole project, I absorbed a lot of knowledge which can be applied in my daily life. My main objective of this project is to create a software that contains all types of tools needed by a bioinformatics student which will be easier for them to access all the tools at the same time. As a bioinformatics student, I had been facing many issues in finding a perfect software to do my assignments and learning purposes. Even at times, I had wrongly chosen the wrong software to do my assignments and which caused my marks to be reduced. As a solution, I thought of creating a software where bioinformatics students are able to use the right tool for their learning and not have a hard time choosing correct

software. After doing this project, my interest towards cloud computing is at the peak compared with my previous interest in cloud computing. My interest towards cloud computing makes me explore more in this field. This project changed my path where it brought me a thought of creating more softwares and also to be involved in cloud computing related things. I think I have to improve my research skills more for me to get along with this industry.

4. Nur Syafika Binti Mohd Salmizi

   I gained some knowledge on how to plan and design the architecture of our project related to cloud computing and implement it on our own software . To this day , there are many software programs that we use for our studies, so to make things easier we try to figure out a platform for the students and also the teachers in terms of education. Basically , our project is more to complete software that has several tools of famous software that students usually use . So regarding this matter , I learned how to decide and categories what are the importances that students and teachers need while in the learning process and they can use our software to enhance their basic learning . We collected data to maximize the multifunctioning of our project . Plus , I learned multiple amounts of the new software that we can use to make our software succeed . This project makes me get involved in the technology information system in it and also by doing this project , it is a really good opportunity to expand my skills and knowledge regarding data analytics and so on .

5. Yusra Nadatul Alyeea Binti Yusramizal

   Throughout running this project, I have learned a lot especially about the use of cloud computing itself. With this project, it can further enhance my knowledge of the use of cloud computing in addition to its applications in our lives. Throughout the running of this project, it is undeniable that there are some time constraints due to assignments for other subjects. But, with the cooperation and agreement between the group members, we were able to provide the time available to discuss further regarding this project and were able to complete it within the stipulated time period. The implementation of this project to some extent is able to increase my potential either in soft skills or hard skills. My soft skills can be improved when working in a group because it involves communication and cooperation in the group while my hard skills are in the use of cloud computing itself. Honestly, there are many things that I still do not know and understand in more depth whether it is about cloud computing and also other 4th IR technologies. So, this project opened up my opportunity to learn more about its uses as well as I had the opportunity to design my own cloud computing. This project has also attracted my interest to delve into this cloud computing in more depth because there are many new and interesting things that I can learn in line with this course I took which involves Computer Science.