

# IS2108 IT Project Management

## Group Assignment



University of Colombo School of Computing

### Team details

No	Name	Registration Number	Index number
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## *Acknowledgement*

We would like to express our sincere gratitude to our course lecturers Ms.Punsisi Somaratne and Ms.Sanduni Thrimawithana for providing us invaluable guidance, comments and suggestions throughout this Information Technology Project Management course. As this subject is a theoretical subject we are lucky to get some practical knowledge through this group assignment as we create a report of planning stages of the project that we are currently doing and presenting it to a panel. We also express our thanks for providing us an opportunity to work on this assignment as a team and to do a presentation to improve our presentation skills and other group work skills.

## *Introduction to the project*

- The system CL-Gen is a web-based platform, which will be established to manage all the details of the students' school career. It will collect all the details of academic activities and extracurricular activities and use that information to generate student's leaving certificate and character certificate at the end of the period.
- The main objectives of the project are,
  - Enable the teachers and students to access the information from anywhere.
  - Enable authorized users to view and edit the system information from anywhere.
  - Enable the students to view and make requests through the system.
  - Enable to print the leaving & character certificates based on recorded information.
  - To help the school administration to store and manipulate data easily and effectively.
  - To help the school system to choose the right student in the right position.
    - When choosing the head prefect of the school
    - When choosing students to the perfect board.
    - When choosing students as society presidents.
    - When selecting the prize winners of the prize giving.
  - To help the teachers when calculating the average marks of the students.

# *Project Planning*

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- Main steps identified in project planning are,
  - Selecting a project
  - Identifying the project objectives
  - Identifying the project Infrastructures
  - Analysing the project characteristics
  - Identifying Products and Activities
  - Estimating efforts for each Activity
  - Identifying risks for each Activity
  - Allocating resources
  - Review and publicize the plan
  - Executing the plan
  - Lower-level planning

## *0. Selecting a project*

All the appointed four members of our group came out with different project ideas related to different social problems as well as common world scenarios. After having discussions with the group supervisor we listed down all the pros and cons of each project idea along with its functionalities; we were able to summarize all the probabilities of implementing the proposed solutions and selected a one project which can be feasible for implementation.

We did a feasibility study in order to study is the assessment of the practicality of a proposed project. Feasibility study carried out under different categories as,

- Technical feasibility
- Economic feasibility
- Legal and ethical feasibility
- Operational feasibility
- Schedule feasibility

### **Technical feasibility:**

Technologies to be used are, HTML5/CSS3/JavaScript for front end, PHP as back end, MySQL as DBMS, Apache and MySQL as server technologies, Github as version controlling, Trello as the project management tool.

The mentioned technologies are freely available for development. It is easier to use these technologies to quickly create highly dynamic and interactive elements on websites than other technologies. Most of the team members have the knowledge and expertise on the above technologies. Moreover, as this is a learning project as students, we will be able to put the learning into practice.

Simple and free IDEs like VSCode, Atom, and Notepad++ will be used as coding platforms. GitHub, Git, Google docs, Google Drive will be used to collaborate with team members.

MySQL is a fast and powerful open-source relational database management system. Anything a website might need to find and serve up data to browsers is offered by MySQL. Nature of PHP and MySQL helped propel them both forward. Instant access to scripting languages like JavaScript will be granted with the .php extension. Also, PHP is a flexible language.

The system we have proposed is a web-based one. So, it can be expanded easily as well as every user with an internet connection can enrol with the system under the restrictions provided with the system.

So, we can prove that the proposed record system (CL-Gen) is technically feasible.

### **Economic feasibility:**

Economic feasibility is somewhat not related to this system as this is a learning project and we are doing this project in a non-profitable aspect, but it costs to design and implement the system. In the short run, the development activities obtain a small cost. However, this is developed by a group of 4 university students. The amount of funds that the clients can invest in the system is limited as the system is developed for a school. When considering the development cost, it is very low because the system is developed from open source software tools and languages.

Free internet facilities are provided by UCSC, for development and implementation.

Although this is a project with a non-profitable motive, we could develop furthermore in due course and hand it over to schools or for zonal education offices for an affordable fee.

The web application will be hosted using a dedicated Amazon EC2 server. The web server provides secure, resizable compute capacity. The dedicated hardware of 4GB

RAM and 2 core CPU will be sufficient at the start. The deploying cost will be \$11 per month.

So that we can conclude that the system will be economically feasible.

**Legal and ethical feasibility:**

This is the measure of how well a solution can be implemented within existing legal and contractual obligations.

All the details regarding the students are not visible to the unregistered users. The registration process of users could be only done by the administrator of the system, which prevents unwanted persons from accessing the system. To verify user details, a request should be sent to the office and the admin to verify it. Here, we are going to implement authentication levels to the system. According to the authentication levels, the system users could access the data. The system data could be modified by the authorized user according to the authentication levels. The student is restricted from editing his/her data and the specific student cannot view any other data of the system, other than the student's profile details. So the privacy of information is highly protected.

The user data will not be exposed to external parties under any condition. Only the registered users of the system would be able to access the system data. In legal terms there are no issues involved with this system as our system does not break any rules and regulations under the laws in our country. Not only that, not contractual obligations too.

Hence, measures have been followed to ensure that no legal or ethical issues occur within the system.

**Operational feasibility:**

The system we propose could be used in schools throughout Sri Lanka. With the current manual system, the records are stored manually in files and when referring to these files there is a significant time delay. Old records can be damaged or destroyed with time. But, with the new automated system, students, parents, administration, teachers, and the office can access the records which are stored efficiently.

Furthermore the records are more reliable in the system as they are gone through several verification processes.

On the other hand, there is no need for a high literacy level to operate the system.

There are several non-academic staff members in a school. With the support of an IT teacher in school, the staff can quickly understand the newly automated system's features and get trained for it within a short period.

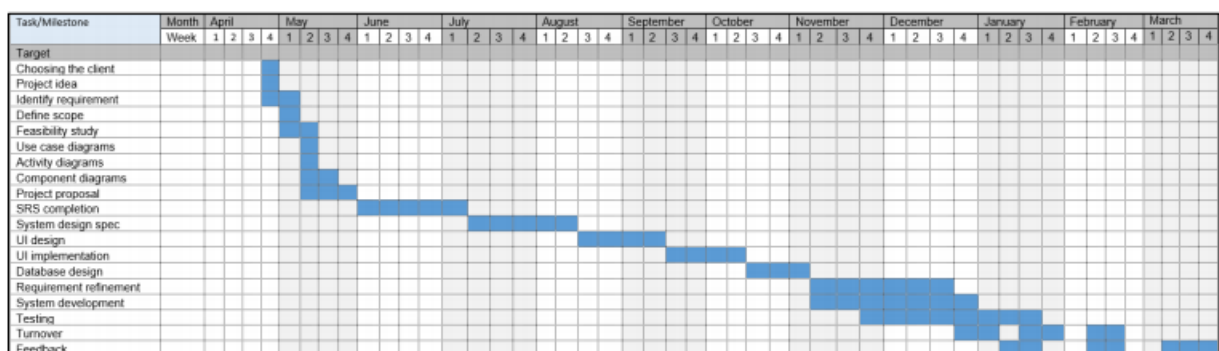
Manual data entering requires time and the response time of a manual system is high. With the introduction of the automated system, the workload of the employees of school will be reduced as physical record- keeping through files is prevented.

As the system is mainly related to the school administration, we had considered the efficiency and simplicity before the attractiveness and complexity of the system. The proposed system is capable of holding the data to be used securely as unregistered users cannot view the profiles.

The system we have proposed is a web-based one. So it can be expanded easily as well as every user with an internet connection can enrol with the system under the restrictions provided with the system.

### **Schedule feasibility:**

The scope of the project can be covered within the schedule because the group consists of four members with different capabilities. A period of a whole academic year is given to complete the system. The requirement analysis phase took around a month which made the identification of the requirements clearly. The development or implementation is given around four months which makes the implementation easy as there is more time to build up the best programs.



Finally after analysing the project idea under each of above mentioned feasibility criterias, we collectively decided that the project is feasible to implement and launch.

We evaluated the project selection on an individual basis as well as a part of strategic planning. Each of the group members presented their ideas, evaluated the proposed projects in their point of view by sharing their experiences as well. Our team and the supervisor did strategic planning to assess whether the project fits the long term goal of the selected school as well as other schools. By considering all the facts, we were able to select a project.

## ***1. Identifying the project scope and objectives***

### **Identify objectives and practical measures of the effectiveness in meeting those objectives**

CL-Gen has to be created as a web based platform to manage all details of the students school career, by collecting all the details of academic activities and extracurricular activities in order to generate student's leaving certificate and character certificate.

We identified what we should plan to achieve by the end of our project. Our project objectives are attainable, time-bound, specific that can measure at the end of our project. Based on the client requirements we came out with our objectives. Our objectives are as follows,

- Enable the teachers and students to access the information from anywhere.
- Enable authorized users to view and edit the system information from anywhere.
- Enable the students to view and make requests through the system.
- Enable to print the leaving & character certificates based on recorded information.
- To help the school administration to store and manipulate data easily and effectively.
- To help the school system to choose the right student in the right position.
  1. When choosing the head prefect of the school
  2. When choosing students to the prefect board.
  3. When choosing students as society presidents.
  4. When selecting the prize winners of the prize giving.
- To help the teachers when calculating the average marks of the students.

Then we simply decided all the work that needs to be done in order to achieve a project's objectives. In other words, that is our scope. The scope involves the process of identifying and documenting specific outcomes, milestones, tasks, costs, and timeline

dates specific to the project objectives. We discussed scope under 2 types as inscope and outscope.

As we identified, scope of the project is to provide users with a web platform to store all the necessary information regarding students and other individuals of a school in one database, which can be accessed at any time by any user within the school system, based on specific access levels. With CL-Gen users can Insert student information, Insert teachers' information, view students' personal information, view students' academic and extracurricular information, track students' academic and extracurricular progress regarding the data in the system, request character certificate and leaving document, generate character certificate and leaving document, request data edits by the teachers, students, and parents, view announcements and news regarding school activities, etc.

Not only the inscope, we decided our outscope too. We identified our outscope as developing a web system to connect every school, connect all the institutes outside the school to include external achievements of students, maintain records of the students' attendance, payroll information management of the school staff.

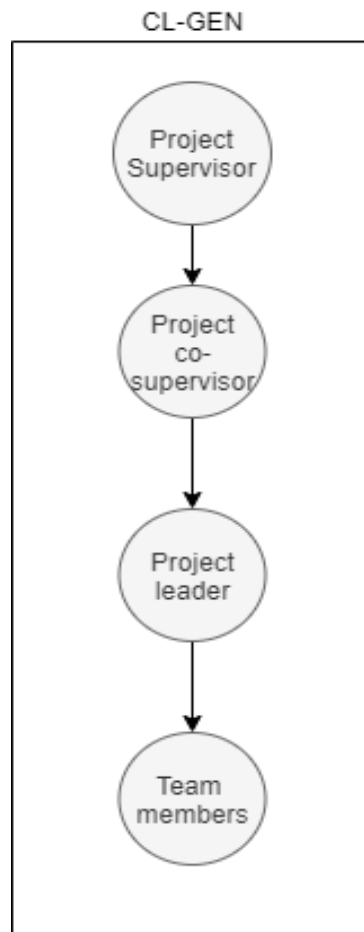
We came out with different assumptions too.

- All the users will have internet access.
- The office staff will enter valid information when posting information.
- Moderators will constantly monitor the content in the system daily.
- The office staff will continuously update the information.
- Teachers and the office will act responsibly when posting marks, details on clubs, societies, and extracurricular activities, which include not posting fake information.
- The staff has basic computer operating skills
- Students/Parents provide all the correct information about them when registering.

### **Establish project authority**

Although there will be many stakeholders concerning the project one overall a project authority person must be defined for the benefit of the project. In our group project the overall project authority is with the group supervisor. The co-supervisor guiding us to make this project a success. Group leader and the other members give their full effort to make this project a success.





### **Identify Stakeholders**

We identified the project stakeholders in this stage. Stakeholders are the group of individuals who have an interest in the project. There are mainly two groups, internal stakeholders and external stakeholders.

1. Internal – team, supervisor and co-supervisor
2. External – IT individuals, clients/customers, system users(admin, teacher, students, parents, officers, unregistered users)

### **Modify stakeholder analysis in the light of stakeholder analysis**

Here we can review the objectives we have already set and modify if needed in order to better facilitate the stakeholders' interests in the project. But doing so might sometimes increase the scope of the project which would lead to incompleteness of the project within the budget and time already set.

Earlier, all the advanced functions of the system were to be done by the super admin of the system. But due to the workload that he would have to single handedly manage, upon discussion it was agreed to add a new stakeholder called admin who will be doing specific functionalities such as user management that were previously to be done by the admin himself.

### **Establish methods of communication with all parties**

Communication is an integral part .The communication with the internal parties or internal stakeholders is important.At the same time we established methods of communicating with all parties such as the team,client,supervisor,etc.We decided to use project management tools such trello in order to track the performance of individuals.

Stakeholder	Method
Team	whatsapp,trello,github,zoom
Supervisor and co-supervisor	zoom,emails,whatsapp
Admin	Straightforward
Teachers	Through inquiry messages
Office	Through inquiry messages
Students	Through inquiry messages
Parents	Through inquiry messages

## ***2. Identifying the project Infrastructures***

There is usually some kind of existing infrastructure into which the project can fit. A project management infrastructure, for the most part, consists of standards, work distribution, workflow, standards followed etc that are defined by the group project coordinators how project management work is to be performed.

### **Identify relationship between project and strategic planning**

We Identified the relationship between the project and strategic planning as well as identifying projects to be carried out, the team needs to decide the order in which this project is to be carried out.

Although this is a four credit subject, strategically it weighs a lot. So there must be pretty much planning for this project. The 4 credits very much affects the GPA as well.

### **Identify installation standards and procedures**

Throughout the project there were deliverables at each stage. Still the deliverables are continuing. All the earlier parts of evaluation, the documentations could be seen. So the track of the member work schedule is quite important. So we used to have a project management tool named "Trello".

First we chose a model namely modified waterfall model, which supports requirement changes well as well as the documentation of the changes in an orderly manner. At the end of requirement analysis we will be producing the SRS (system requirement specification). So we created a repository in GitHub and started work on our project. And we installed and used the same versions of all tools such as VS code, etc.. We started developing components. After getting the confidence and familiar with operations, we started developing our project.

### **Identify project team organization**

We're having a team consisting of 4 students. They perform different skills. We can identify the specialized areas for each of the members in our group. We have the ability to work together to complete the tasks. Four of us are looking at different user roles of the system.. So she will be expected related to that user role. So when a problem arises in that particular area we could contact him or her and sort it out very easily.

Two of the members are good at designing. So her priority had given to UI designing. But overall all the 4 members will be involved in front end as well as the back end implementations.

### ***3. Analyzing the project characteristics***

We analyse project characteristics to make sure that the appropriate methods are used for the project. We completed this phase under some sub steps as mentioned below.

#### **1. Distinguish the project as either objective or product-driven**

Two stages of a software are object driven and product driven. Object driven projects are based on producing a new software system. Product driven is to create the software product. When a project is product driven, the client provides the details of the product.

Our project is to meet the objective of creating a web application to generate character and leaving certificates for students. Generating those certificates was the problem of the client and he asked our team for solutions. So our final outcome was a system creating a solution for our client's problem which meets the objective of both parties. So it is an object driven project.

#### **2. Analyse other project characteristics**

CI-Gen is an information system to be developed as well as a process control system. CI-Gen is a process control system because it has a data collection of students, teachers and parents and the activities performed. Also it has a distribution system that collects and stores data from various sources.

Safety is also considered as another characteristic. No life is being threatened by malfunction. No information will be visible to the unauthorized parties.

CI-Gen consists of an effective and user friendly navigation system. Menu items are well organized in the navigation menu. And visibility differs according to the type of the user. Also project CI-Gen has good internal linking.

Interfaces of CI-Gen are designed and developed using color theories. And the number of clicks has been reduced as much as possible. Tabs and usable forms are included where necessary.

### **3. Identify high level project risks**

It is normal to have risks in every project. We identified the risks that can occur within the time and the budget.

Requirements of the project can be changed. And it can make a huge impact on the scope. So it will take more time and effort to complete the project than we estimated in the beginning of the project.

The main risk we have is we are not sure if it is possible to implement the auto generation of the certificates as we are expecting with the technologies we use. Also as the knowledge we have might not be sufficient to fulfil the tasks. So there might be a huge time consumption and it may cause failures of some functions and it can make it more difficult for us to complete the project on time.

### **4. Take into account user requirements concerning implementation**

Admin, Officer, Student, Teacher and Parent are the five types of users in CI-Gen. Their requirements are considered in this phase.

Admin main requirements are to create accounts, user management, duty management and category management. Officer main requirement is to generate character and leaving certificates automatically. Officers other requirements are maintaining newsfeed, managing user information, exam results, requests and classes. Teacher requirements are to view newsfeed, request edits, add class details, add marks, add fees and fines and view inquiries and replies. Student requirement is to view profile, newsfeed and make requests. Parents behave the same as the students.

### **5. Select development methodology and life-cycle approach**

Methodology is a way of structuring the processes of a project. Since the requirements can be changed and the risks that can occur, we have decided to use a modified waterfall method. Which is an incremental and iterative methodology that can help us to carry out our project without . Therefore it is not necessary to start the system design and implementation with a full specification requirement, the project can cooperate with the changing requirements. The existing requirements can be reviewed and altered as the process goes on, which is beneficial for us as we are implementing the project for the learning purpose as a group of students. Furthermore, with this methodology we can generate a working software quickly, which is beneficial when measuring the degree of

success of the project. On the other hand, it is easy to test and debug the system, by considering part by part of the system. Overall, the iterative and incremental methodology provides a flexible environment for the progress of the project.

## 6. Review overall resource estimates

After identifying major risks, this would be the good point to re-estimate the efforts and other resources required to implement the project. If there is enough information, estimation based on function points might be appropriate.

More and more functionalities may get added during the system designing from time to time. So here we have taken time as a resource and estimated the minimum number of man hours that can be allocated for this project

Weekdays working hours = 3

Weekend working hours = 4

Number of members in the group = 4

Man -hours per week =  $(4+3) * 4 = 28$

Estimated number of weeks = 39

Estimated total number of man hours =  $28 * 39 = 1092$

## 4. *Identifying Products and Activities*

- There are main products/activities of the project and their respective instances which can be identified.

### Main products of the project and the product instances

Name of the main product	Purpose	Instances of the main product	Derivation of product	Quality criteria / Standards applied
Project proposal	To give a brief introduction to the stakeholders about the project	-Introduction -Objectives -Functionalities -High level system architecture -Use case diagrams -feasibility of the	This is the initial product, after selecting the project	-Provide a good understanding for the stakeholders about the project.

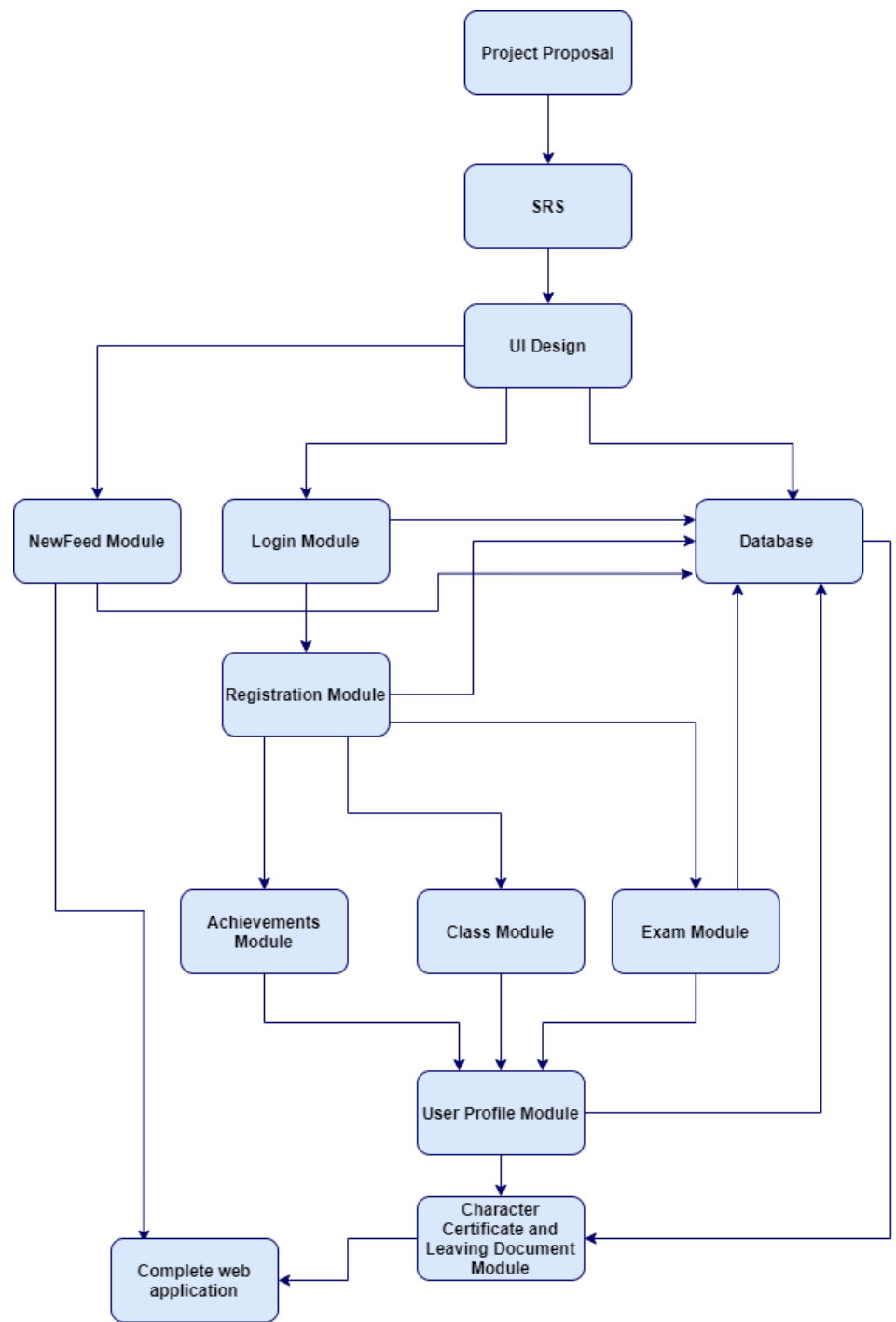
		system		
Software Requirement specification	Provide a detailed overview of the product and its objectives to the stakeholders.	-Class diagrams -ER diagram -Use cases -Detailed Requirements specification	Based on the project selected and initial introduction from Project proposal.	-Provide a detailed understanding for the stakeholders about the project.
User Interfaces	To provide user friendly interfaces to the web application	-Wireframe design -Actual design -Finalizing the designs	Wireframe design will determine the user interfaces created which will follow up with finalizing the designs	The UI created should be user friendly and simple, to be easier to interact with
Login and Registration	Provide users with login in to the system to access other products	-Login -User registration	Based on the UIs created and the requirements specified in SRS the login and registration will be developed	Simple login for the users, and efficient registration with minimum error when entering data
Database design	Store the data regarding the system, system users and other system products.	-Tables -Relationships between tables -specified columns and rows	This product is derived through the requirement of the system	Database with reduced redundant data, ensuring the accuracy and integrity of data
Exam Result Management	Managing the results of the Government exams and maintaining records	Exam details <ul style="list-style-type: none"> <li>- Insertion</li> <li>- Deletion</li> <li>- Updating</li> </ul>	-Derived according to the requirements in the SRS	-Accurate and convenient management of data
Class management	Maintain records about the classes, the students and	-Class details -Student Marks -Class teacher information	-Derived according to the requirements in the SRS	-Accurate and convenient management of data

	marks.			
Achievement management	Maintain records of the Achievements gained by the students in extracurricular activities	-Sports -Societies -Teachers in charge -Achievements	-Derived according to the requirements in the SRS	-Accurate and convenient management of data
User profiles	Provide the users the ability to maintain their profile	-General information of the user -Achievements -Academic information	-Derived from the data which was included in Achievements, Exam results, and class information.	- User friendly interpretation of data to the users - Easy and convenient to find details
Character certificate and Leaving document Generation	System-generation of the character certificate and the Leaving document of the students.	- Character certificate document design -Leaving document design -Auto implementation of both	-Derived from the data which was included in Achievements, Exam results, and class information and the user profile.	- System generation of the mentioned documents with minimum user interaction and maximum accuracy
Newsfeed	Providing news and announcements to the users	- News from school - Announcements	-Derived according to the requirements in the SRS	- User friendly interpretation of data to the users - Easy and convenient to find details



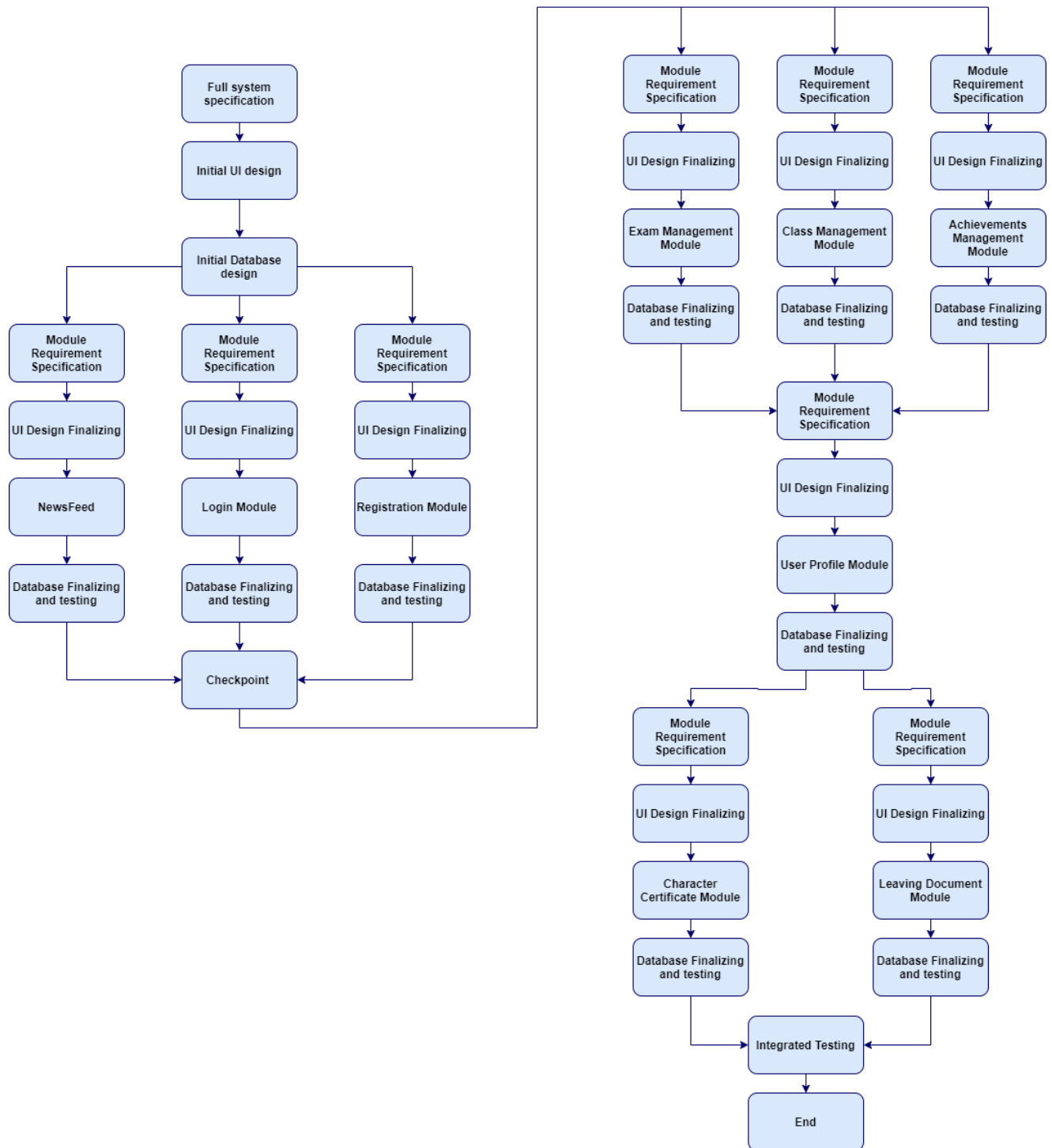
## General Product flow

This Flow diagram is created to give an approximate idea on how the products are formed in the system. This is not the finalized flow of products.



## Ideal network activity

This Network activity diagram depicts the approximate flow of activities in the system.  
This is not the finalized flow of activities.



### **Checkpoints of the project**

- We have identified five main checkpoints for the project
  - a. Presenting the project proposal
  - b. Concluding the SRS
  - c. Finalizing the UI designs
  - d. Finalizing the Login and Registration modules of the system
  - e. Finalizing the functionalities of the system
- These were identified, so that we can measure the progress and success of the project based on the predefined timeline and plan.

## ***5. Estimating efforts for each Activity***

- Then each activity should be analysed and the effort needed for each should be estimated. Some activities depend on other activities, therefore that also should be considered when estimating efforts.

### **Bottom Up estimate**

- The whole project activities will be separated and each activity is broken down into sub processes.
- The effort is estimated in a bottom up approach based on sub processes.

(One day = 3 hours)

Activity	Sub processes	Effort (member-days)
Creating Project proposal	-	10 * 4
Creating SRS document	-	20 * 4
User Interface design	Wireframe design	5 * 4
	Actual designing	20 * 4
	Finalizing the designs	5 * 4

Login and Registration development	User login	3.5 * 4
	User registration	4 * 4
Database design	-	5 * 4
Class management	Class structure creation	4 * 2
	Student and teacher details insertion	3 * 2
Exam Result Management		5 * 2
Achievement management	Connection with user profiles	6 * 2
User profiles	Profile Creation	5 * 2
	Database connection	2 * 2
Character certificate and leaving document generation	Character certificate format specification and implementation	3 * 4
	Leaving document format specification and implementation	3 * 4
	Connecting to user profiles	2 * 4
Newsfeed		3 * 2
<b>Total Effort estimation</b>		(108.5 * 4) Member days = 434 member-days

- Hence the total time elapsed for the project can be identified as,
  - $434 * 3 = 1302$  hours
- Hence when comparing with overall effort estimate which is 1092 hours, after calculating the effort product by product we can see a small increase in work hours.
- But this value can always change when actually implementing the project, which can increase or decrease according to circumstances.

### **Creating controllable activities**

- Each and every long activity is divided into several small activities.
  - Ex -:
    - Class Management
    - Character certificate and leaving document generation
- Collection of short and similar activities to increase the efficiency
  - Ex -:
    - UI design for the whole system

## ***6. Identifying risks***

### **Risks identified and contingency measures**

- Common risks can be identified for all the activities as follows,
  - Member difficulties such as due to sickness and personal problems
    - Can allocate 5 days for each member
  - Technical problems
    - Some technologies can be new to the members when working, therefore it might take some time to learn about them and get used to them.
    - Can allocate 3 days for each member to learn new technologies.
  - Sudden requirement changes or addition of new requirements
    - Should be aware about the sudden requirement changes
    - Allocate 6 days to work on them.
  - Low member engagement
    - Some members can involve less with the project activities.
    - Each of the members should have at least 10 days allocated to work on that.

### **Adjusting estimates by taking account of risks**

- By effort estimation we identified 434 member days for the project.
- But by considering the possible risks we revise the estimation of the member-days for contingency plan for the project as follows
  - Additional  $22 * 4$  member-days have allocated based on the contingency measures of minimizing risks
  - Therefore, revised effort estimate  $= (434 + 88)$  member days  
 $= 522$  member-days for the project.

## ***7. Allocating resources***

One of the main task in the project is Resource allocation. Resource allocation is the process of assigning and scheduling resources to project tasks. All the resources should be assign proper way according to the schedule & identified project task.

### **Step 7.1: Identify and allocate resources**

**Labour:** Development team that engage in development, test & implementation and Supervisor and mentor who guide, provide help & guideline to developers through bi weekly review the tasks carried out during the each week.

**Equipment:** Equipment is resources use to development such as computers. So computers are the equipment resource of this project and it is available throughout the development time period.

**Software :** Free and open source software, which are used in making the development easier such as GitHub.

**Materials:** External storages use in the project and project documentation, learning materials use for reference throughout the project.

**Time:** Time is the most important resource which should manage proper way to deliver the project on due date. It can be reduced by increasing the other resources (Labour resource specifically). And the time slots where the group members are free from other academic and personal work and dedicated time slots for this project will be made use to complete this project on time.

**Money:** Secondary resources which will be consumed by other resources of the project. This mostly used for the electricity, Wi-Fi bills that will gather up when used in developing.

### **Step 7.2: Revise plans and estimates to account for resource constraints**

In this section we look at situations where one activity needs to be completed in order to start off with another activity. If these two activities are carried out by two individuals the second individual will be idle while the first activity is completed. To address such constraints in our project connected activities will be done by the same individual in order to save time.

## ***8. Review and publicize the plan***

### **Step 8.1: Review quality aspects of the project plan**

If we found something went wrong in the project, previous activity is not done correctly and it should be done again. Therefore when completing the activity it is necessary to do the debugging and confirm there that activity is error free. So all completed task should have quality criteria, to measure quality. These quality criteria must do during the quality checking time before “Sign Off” the project as completed.

Using the team members those who not involve to the above task in our group, we planned to carryout manual checking of activities

### **Step 8.2: Document Plans and Obtain Agreement**

Documentation of the project plan must do very carefully. it is important that all the stake holders in this project should clearly understand the commitments they need and agreed.

Therefore in our project we have planned out deadlines for the documentation to be done and be handed over to the supervisor and mentor for feedback.

## ***9. Executing the plan***

At the time of the project starts, each activity should have a detailed plan. Tasks that are far away need to be planned temporarily. Then you have a clear understanding of what needs to be done in the latter part of the project. That is why this stage will be detailed later.

## ***10. Lower-level planning***

The above mentioned 10 steps can be applied to the whole project to plan out the project more successfully. Some activities need to be planned again in more detail using the above mentioned steps. The auto generation of the certificates is considered as a function where more planning is needed because it depends on all the data that is being processed in CL-Gen.

# ***Project Life Cycle***

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## **Individual Contribution**

Requirement Analysis	W.H.M.Gunathilaka	2018/IS/027
System Design	H.S.H. Perera	2018/IS/056
Implementation	K.M.D.M.K.Gamhatha	2018/is/025
Verification	P.A.A.S.Dias	2018/IS/015

## ***Requirement Analysis***

Requirement analysis is one of the important stages in our project life cycle of the project CL-GEN. Proper planning is a must when deciding a system. A project's requirements must be clear upfront, and everyone involved in a project must be well aware of those requirements. Each team member should also understand what their role will be in the project and what that role entails. All of the information collected must be thoroughly documented and then distributed to everyone on the project.

It is the most important factor in building a correct system. All possible requirements of the system to be developed were captured in this phase and documented in a requirement specification document.

We examined how the current system works, what the system must do, when the system is used, what the user needs, who will use, where the system is used, for what requirements we gathered, etc. It helped us to identify system problems and extract solutions for the user community.

We followed so many fact finding information gathering methods in order to collect requirements. First of all, we were able to conduct interviews with the Principal of the school via telephone calls as well as via WhatsApp calls as covid-19 pandemic directed us not for a physical meeting. We were able to conduct an unstructured as well as a structured interview with the client. Here we obtained the facts, verified facts as well as clarified facts, identified the requirements and were able to solicit ideas and opinions.



We did sampling of existing documentation. We studied existing latest documentations and projects related to our focus. Not only that we researched and visited the good source of information such as google which is related to our path.

We conducted a survey for checking the feasibility of the project. Questionnaire was there which allowed us to collect information and opinions from a larger audience. Our team decided and used both free format as well as the fixed format questionnaires to address the community.

After collecting above requirements, we were able to document the system requirements. They are the services the system is to provide and prescribe constraints for its operations. So our SRS (System Requirements Specification) included both functional requirements which are explicitly identified by the users and non-functional requirements which are not explicitly identified by the users.

We documented the use case diagrams, activity diagrams, sequence diagrams, component diagrams, etc. in our SRS. So that the client as well as the developers(team) could obtain a clear idea on what the clearly defined requirements are for the proposed project.

## ***System Design***

After the requirement analysis we started designing the system architecture and mapping the stakeholders to identify all the inputs, processes and outputs needed and also to help avoid misunderstandings.

We drew a use case diagram to capture the core functionalities of a system and visualize the interactions and workflow between the use cases and the actors in the requirement analysis phase.

Then we designed the component diagram to show the relationship between different components in our system CI-Gen in the System design phase using the requirements we gather in the required analysis phase.

The Software Requirement Specification (SRS) document was created to carry on both phases of requirement analysis and system design. In SRS there were usecase diagram, component diagram, all the activity diagrams, sequence diagrams, state transmission diagram and wireframes of the system that needs to be developed. Rather than that, this SRS document contained a feasibility study and prototypes of user interfaces.

Enhanced entity-relationship (EER) diagram was drawn to design CI-Gen's database with high-level models. It helped to identify all the entities, attributes of the system and their relationships.

In brief these diagrams helped us to identify and visualize,

- |                              |  |
|------------------------------|--|
| • Usecase                    | - Actors and functionalities                   |
| • Component                  | - Relationship between different components    |
| • Activity Diagram           | - Flow of the functions                        |
| • Sequence Diagram           | - Even sequences                               |
| • State Transmission Diagram | - Behaviour of individual objects              |
| • EER Diagram                | - Entities, attributes and their relationships |
| • Wireframes                 | - Structure of the website.                    |

Feasibility study was conducted to identify the risks, technologies to be used, capability of the team, project constraints, time and budget that can be allocated. We defined and clarified the goals and objectives of our system as well as the limitations with the help of the data we collected from the requirement gathering phase.

When we were designing the system, we decided to choose three tier architecture as the system architecture of CI-Gen. We chose three tier architecture because each tier runs on its own infrastructure and each tier can be developed simultaneously. Also, tiers can be updated as needed without impacting the other tiers.

In three tier architecture, tiers were designed as mentioned below.

- |                     |  |
|---------------------|--|
| • Presentation tier | - User interfaces of all the users.    |
| • Application tier  | - All the functionalities of the users |
| • Data tier         | - CI-Gen's database                    |

All the diagrams were designed and drawn using the online tool "<https://draw.io>".  
Prototypes of the user interfaces were designed using "<https://pidoco.com>"

## *Implementation*

After the requirement analysis and system design phases, actual implementation of the project starts in this phase. The requirements identified in the requirement analysis phase are put into working modules based on the design specified in the system design phase. The actual working code is produced in this phase.

Mainly the project deliverables specified in the software Requirement Specification, changed or added new requirements, and finally working software can be identified as the output of this phase. This can be identified as the longest phase of the project life cycle. The team accepted the responsibilities of several areas of work to work on them to provide the required output for the stakeholders.

In our project we started off the development phase by clearly dividing the workload among the members, based on the user roles we have identified in the system during requirement specification. This was done with the guidance of the supervisor that was

allocated to our group. With that UI design and the coding was divided, to work on. Most of the UI design were created with participation of all the members and by considering everyone's perspectives, to get the optimum and best possible User Interfaces.

With the development process, we had to face some problems and challenges such as,

- Lack of technical knowledge on some areas
- Changing requirements
- Communication problems

These was managed and overcome by scheduled meeting with supervisor to clarify the technical doubts that we had, joining training programs and tutorials, weekly meeting with members for proper communication, proper discussions and researches on changing requirements

We are using project management tools such as GitHub, Trello to make the process of development easier, real time and convenient throughout the process. As the project was carried out remotely by each member due to the pandemic situation, GitHub has been a resourceful platform for the project.

We are using PHP as the main technology in developing the project which is incorporated with SQL, javascripts like technologies.

For the technical problems that we had phased during development, we used techniques like team discussions, discussion with supervisor, researches on the problems and joining some tutorials and training programs. Some of the technologies were new to all the members, therefore it was a challenge that we had to face.

In our project, implementation can be identified as an ongoing process, as some of the modules are still being developed and all the modules are not yet completed.

## *Testing*

Simple understanding of the testing is testing the application base on client requirement. To start the testing we must understand the requirement first. To understand the requirement we must go through the SRS.

Once we are clear about the requirement we have to come up with a particular test plan to get implemented for all our testing activities.

Once the testing plan has completed we have to prepare scenarios. Once the leader gets reviewed and approved, they begin to write test cases.

Once test cases are reviewed and approved then I need to begin the test execution. When executed the test cases need to be compared with the expected result and the actual result. If both are matching we consider test cases to be passed otherwise it will fail.

If the test case has failed the tester needs to prepare a defect report and get assigned to the developer. Developer will fix the defects and reassign to the tester. Then retesting the defect if the defect is fixed testing is successful.

Based on the above criteria we have execute the testing unit by unit. Then we collect units and do the integration testing. Then we have done the functional testing of the user registration module. Still we did not do the acceptance test since we did not deliver the product to the customer.