

Students Attendance System (SAS)

Aimran Ramli¹, Mohd Hanapi Abdul Latip^{2,*}, Hasiah Mohamed³, Nurul Husna Amalina Mohd Adzmi⁴

^a Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA (UiTM) Terengganu, 23000 Dungun, Terengganu, Malaysia

¹ mhanapi@tgnu.uitm.edu.my

* corresponding author

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ABSTRACT

In UiTM Terengganu, student attendance current manual process is based on Academic Affairs (HEA) criteria. Lecturer has to bring attendance sheet to each class and take student attendance. At the end of semester lecturer has to manually calculate and send the report to HEA. Based on preliminary study, current process causing inefficiency on processing reporting. In order to improve the current process, Student Attendance System (SAS) is a system proposed to be developed for Universiti Teknologi MARA (UiTM) Terengganu. Lecturer is the primary users of the system. These allow user control, update, and view the attendance based on session, course and group. SAS was developed with System Development Life Cycle based on Extreme Programming (XP). XP phases involve phase of select user stories for release, then break down stories to tasks, plan release, develop, release to evaluate it. Then, process is repeated until meet user requirement. System testing based on test plan has been conducted. As for the evaluation, the evaluation process is done by three (3) experts then comment and suggestion is produced. Results based on experts evaluation shows that positive feedback from the experts where the development of SAS caters elements of ease of use, flow is easy to be understood and the system is consistent and follow the standard As conclusion, SAS can be improved based on comments and suggestions form experts and it has a big potential to be implemented in UiTM Terengganu.

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1. Introduction

Attendance has been important for many institutions; it is being used for various purposes. Attendances have a minimum percentage that is required in most institutions to make sure students frequently attend classes. Attendance's created for the purpose of reducing absenteeism and truancy. Students need to attend class daily to succeed (Robert Balfanz, 2012). Absent of even two classes in one semester matters.

Rules have been made by all university on minimum percentage of meeting hours including Universiti Teknologi MARA (UiTM). Based on UiTM rules on 2.13 Student Attendance, at 2.13.2 state that students with less than 80% attendance from the total contact hours for every course, without the written approval from the Faculty/Branch Campus/Learning Centre, are not allowed to sit for the final examination of that course (Academic Affairs Division, 2013). For this reason, attendance form is being created to monitor students' attendance.

Attendance at UiTM (Terengganu) is under responsibility of the lecturers. Based on HEA (2013) at 2.13, it clearly shows that students' attendance is a responsibility of lecturers. HEA have to take on account about students' attendance whether they fulfill their minimum requirements of attendance. They need to monitor students' attendance so that students whom far from care of their guardian are not lost in university's life.

HEA use traditional method which is sheets of paper or a book. The paper or the book is then given to lecturer to get attendance on their class. This traditional method involves in taking student attendance could easily allow for impersonation and the attendance sheet could be stolen or lost.

2. Methodology

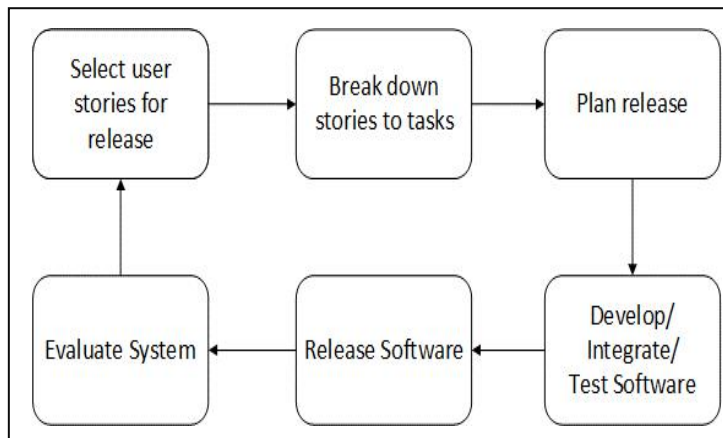


Figure 1 XP method

Extreme programming is used in developing of the system as a whole. Phases for XP are first the users are selected and their stories are written. Then, the stories are break down to multiple numbers of tasks. Considering the task then release plan is decided by the developer. Developing of coding, integrating and software testing is the next phase. The system then release and evaluated. Figure 1 shows details of XP method and it shows that the phase are in cycle and repetitive.

Table 1 explains as general on implementation of Extreme Programming phases on Student Attendance System UiTM Terengganu. Table shows XP phase process and what kind of method that has been used and outcomes from it. Planning process such as preliminary interview with user to get fully understand of user requirement before design phase is began.

Design is process defining the architecture, diagram, database and interface inside SAS. It also when user requirements been fully understand then change and sketch it to design. The requirements of what system can do and its limitation is justify through this process. The outcome of this phase is context diagram, Data Flow Diagram (DFD), site map, Entity Relationship Diagram and interface. In other words, designing precisely tell how system should be develop.

Flowchart is one of method of seeing flow of a systems process. A proper flowchart can avoid the extra work of having to rebuild the structure of database. Restructure of the database will lead to re-develop the system. Figure 2 shows the process flow of SAS from start to the end. At the start on the land page of the system, user have to login to the SAS for the system to verify and redirect user to lecturer, student or staff page.

Table 1 Implementation of XP on SAS

Process	Method	Outcomes
Planning	Preliminary interviews List interviewee stories Select story Break down to smaller task	Problem statement Objective Scope Take down spike (rejected requirements)
Design	Test plan Design diagram	Flowchart of system Problem to be tackled Diagrams (context, data flow, site map, entity relationship diagram) Interface
Coding	Identify software used Code and test with test plan	Knowing the software used Start coding and debug following created test plan
Testing	Create overall test plan for system	Fix the system according to user requirement

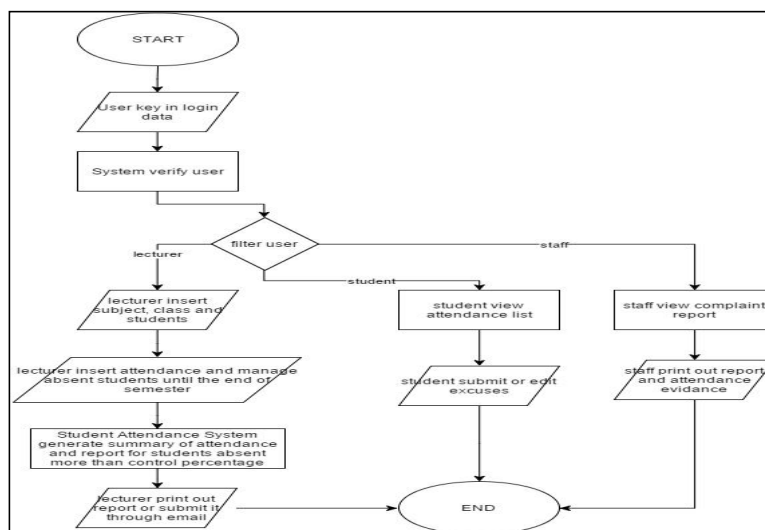


Figure 2 Process Flows of SAS

Context diagram on Figure 3 shows SAS at the center which the propose system that used to create all requirements needed. Then, there are three entities lecturer, student and staff related. Students and staffs which is not the primary user can only view form with additional function for the student to submit their own emergency case evidence. Lecturers can register attendance, view report and send report to HEA related staff though SAS.

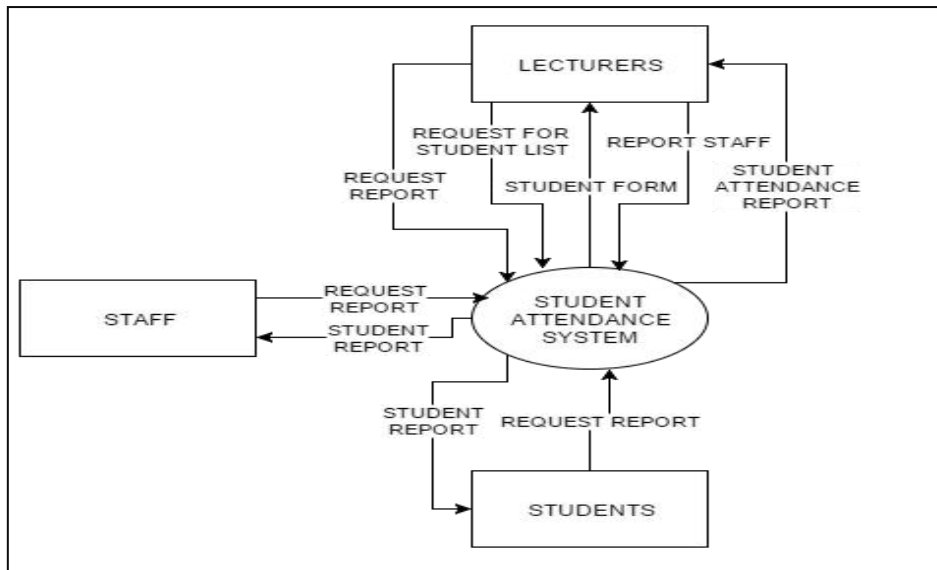


Figure 3 Context Diagram of SAS

Entity Relationship Diagram (ERD) function is to illustrate relationship between entities. Based on Figure 4 there is fifteen entities which five of it, is bridge for many-to-many relationship. ATTENDANCE_DETAILS for example is bridge because relationship between student and attendance is many-to-many. One student can have many attendance and one attendance can contain have many student.

This table is essential for this system to work, it is because by calling this table, system can do a count process on how many students come in one attendance or how many students attend to class for the semester. To know how many time students have attended the class, studetailsID is count in the table with restriction of session and subject called from table attendance. Session is important because with session, system can operates every semester.

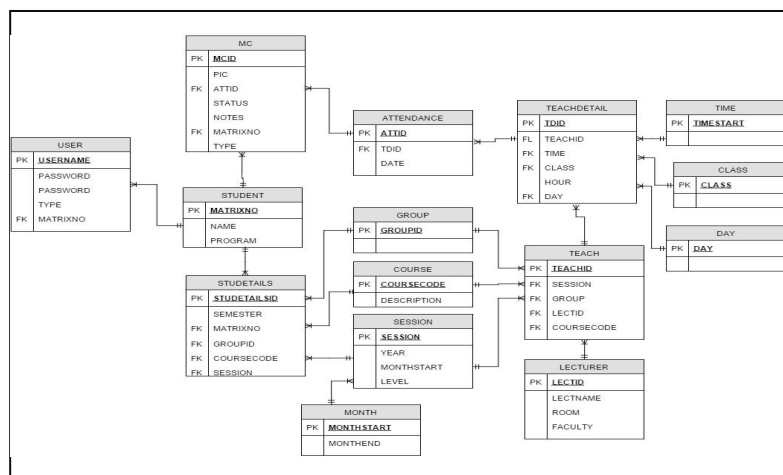


Figure 4 Entity Relationship Diagrams of SAS

According to extreme programming methods, test plan needed to be created to see the problem that may occur when system operated right before the development. Figure 5 shows that unit test plan that created by developer to avoid having such problem while developing system. Extreme programming advantages is solving problem before it occurs is shown in this phase. Test such as what will happen if subject is left empty and button submit is clicked.

Test 1: Input Checking
Input: all data except select course
Test: pressing submit button with an empty data
Output: error message indication there is empty field

Figure 5 Test Plan

The system design is essential for the system to be operated efficiently by the user. Student Attendance System (SAS) develop the system with a simple, neat and straight forward interface for it to look professional and easy to understand. Lecturer can start taking attendance for each time of class until the end of the semester. As shown in Figure 6, students' checkbox is checked by default, it is because number of student absent is less than the number of student attends the class. By using this method, it reduced lecturer number of clicking times to increase efficiency.

On the summary report of the attendance, different color is used to indicate different meaning of data. The blue color indicates that student is absent with excuse, meanwhile the orange color indicates that student absent without excuse. The red color show that student attend class lower than 80 percent. Then, lecturer can proceed to print the report using SAS that has followed format provided by HEA.

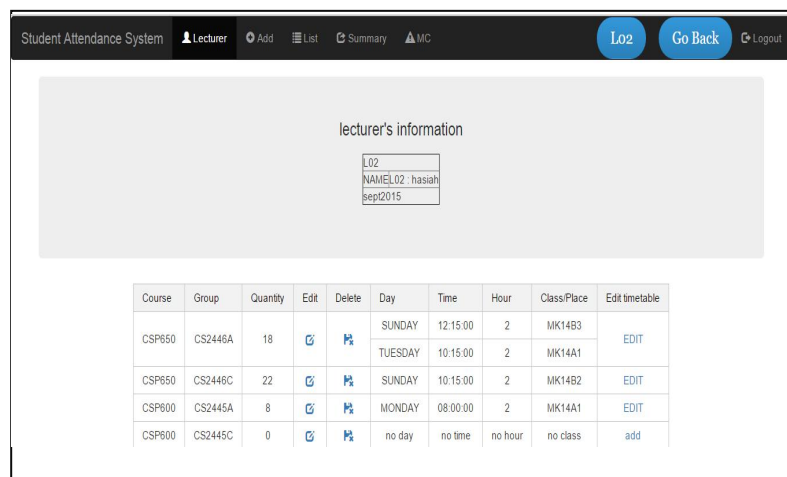


Figure 6 Interface

3. Result and Discussion

Once the system development is completed, user testing and experts evaluation was conducted. User testing was conducted based test plan (system requirement). Test plan was conducted by system developer and tester. Table 2 shows the test plan for the lecturer.

Table 2 Test Plan for lecturer

No	System Requirement	Developer	Tester
		11/12/2015	12/12/2015

1.	Lecturer login to the system	/	/
2.	Lecturer register course	/	/
3.	Lecturer register, edit and delete class for each course.	/	/
4.	Lecturer register, edit and delete students for each classes.	/	/
5.	Lecturer upload students name using excel	/	/
6.	Lecturer key in attendance by unchecked absents students then verified information.	/	/
7.	Lecturer view, edit and delete list of attendance list, then sort by date, session, course code, and group.	/	/
8.	Lecturer view attendance summary for the end of session then sort it by month.	/	/
9.	View and print details of student who absence more than 20 percent.	/	/

Once the system testing is completed, experts' evaluation was conducted. Three (3) experts involve in the evaluation process. Experts give comments and suggestions based on the criteria given to them. Experts also welcome to give any comments and suggestions that not stated in the criteria given to them. Based on terminology and system information, expert has commented that SAS leave user uninformed on implication of their action. Based on learning criteria, the system is easy to learn to use explained by the expert. On interface, it is simple and only display important information that shows that the system keep professionalism in design as shown in Table 3.

Suggestion that has been made by the expert is the button label has to change to something more meaningful that take time for the expert to understand. Even the button icon is repetitive, for the first user it is hard to understand. Other than that, adding breadcrumbs would make it easier for any user to navigate through the system. The lack of information feedback is disturbing. For SAS trying to implement less clicking system is wonderful but SAS have to keep in mind that feedback from system to user is important explained by Expert 1.

Table 3 Comment and Suggestion from Expert

No			
	Features	Comment	Suggestion
1	Does the interface is similar with suitable to be used for UiTM Terengganu's user?	Simple, look professional (Expert 1)	Button label need to change to be more meaningful (Expert 1)
3	Systems are consistent and standard?	Yes (Expert 2)	Repetitive terms should be explained at first (Expert 2)
4	Did the flow of system easy to learn?	Easy to learn how to use (Expert 1)	Adding breadcrumbs (Expert 1)
5	Does it provide mobility through the system?	Only to certain page at header (Expert 1)	Back button with selection (Expert 1)
6	Does the system is understandable?	You leave the users uninformed on the implication of their action (Expert 1)	Need to add more feedback component (Expert 1)
7	Does the system inform about its progress?	Lack of error message (Expert 1)	Add more error message (Expert 1)
8	Satisfied with the ease of completing the tasks in this system?	Simple system (Expert 3)	Learn more on users feedback principles, verification on each text input type field (Expert 1)
9	Does the interface is similar with suitable to be used for UiTM Terengganu's user?	Simple, look professional (Expert 1)	Button label need to change to be more meaningful (Expert 1)

4. Conclusion

As a conclusion, problem with the current process in managing students' attendance record has been highlighted and an online system known as SAS is develop using Extreme Programming model. Once the development process is completed, system testing was conducted and expert evaluation was performed. Result shows that experts gave good comments and suggestion on how to improve the system. Results based on experts evaluation shows that positive feedback from the experts where the development of SAS caters elements of ease of use, flow is easy to be understood

and the system is consistent and follow the standard As conclusion, SAS can be improved based on comments and suggestions form experts and it has a big potential to be implemented in UiTM Terengganu.

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