College of Electrical and Mechanical Engineering

Department of Software Engineering

Advanced Programming

Student Laptop Checkout System Documentation

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Student Laptop Checkout Documentation

1.Background of the Organization and Data Processing Unit

Addis Ababa Science and Technology University, or AASTU, is an Ethiopian Higher institute in Addis Ababa, Ethiopia. The main campus is located in the Akaki Kality sub city, Kilinto area.

The concept of Addis Ababa Science and Technology University had a direct and reasonable connection with the Five-Year Growth and Transformation Plan (2010-2015) of the government of the Federal Democratic Republic of Ethiopia. As it was stated in the plan, the establishment of well institutionalized and strong science and technology universities and institutes of technology will serve as a cornerstone to build an economically developed and industrialized state of Ethiopia. As a result, AASTU was founded in 2011 under the Directive of the Council of Ministers No. 216/2011 by admitting the first batch (2000 students) in November 2011.

The data processing unit within the organization we chose to develop my database system around is the university's student personal computer check in/out system. This is a fully non-digital system which is based on ledgers that hold a specific number to the student, student's name and ID as well as the serial number of the student's laptop. Although this system is somewhat reliable, it is not fast and efficient and can be easily tricked so that stolen computers can slip in or out. Thus, we saw the importance in digitizing this system and creating a much more reliable database system.

2.Problems in the Data Processing Unit

The problem statement for a digital student laptop checkout system with a database is to create a comprehensive and efficient way for students to check out laptops without the need for manual input or paper files. The system must automate the process of assigning laptops, tracking their use and ensuring ownership of laptops with specific students. Additionally, the system must keep a secure record of all transactions in a central database.

As tried to indicate in the background of the data processing unit above , a manual based approach is used. This method of data handling has resulted problems in the following aspects: -

1. Data Duplication and Redundancy - AASTU mainly has two gates for coming to and going out from the campus. So the information related to the same pc(laptop, notebooks...) has to be recorded on both recording books of the two gates.

2. Data Dependence - since the data representation structure is physically linked with the data itself, it is hard to add or remove attributes, and any other structure change without affecting the data is difficult to achieve.

3. Data consistency - any change made to the data recorded on one gate won't be recorded on the other. So an update has to be done twice.

4. Data Integrity - the current data recording can't be used with constraints or any validating rule.

5. Data Security - anyone with the literacy level of reading and writing can manipulate the recorded data so it is unsecure.

6. Storage / Resource Reusability - the record books can't be reused after removing expired data. Expired data in this case refers to the data of students not attending AASTU anymore.

7. Economy - as we have observed as a student in the campus the papers are easily ruined and replaced regularly. This leads to an additional cost.

8. Backup and Recovery - the record books are not secure so a specific page or the whole book can be lost. In such times we have no option from which we can retrieve the data.

9. Time - takes too long to spot specific data.

10. Report generation - not suitable to generate reports for evaluation or research. It can't support facilities like a periodic report to a certain office.

3.Project Objective

General objectives

Ø To record the data in computerized way

Ø To increase data accuracy

Ø To increase the efficiency of the data

Ø To increase the accessibility of the data

Ø To ensure data quality

Ø To create a secured data for the record of personal computer of the student

Specific objective

Ø To save time that can be wasted on writing the information of the students; finding to make sure if their personal computer is registered or not.

Ø To access the data recorded easily when a cross reference is needed

Ø To ensure the data availability and to get the information in simplest way

4.Project Scope

Ø This project is carried out to

· Make entry and exit easier for students who have laptops.

· To reduce cost of paper and pen which need to replaced

· To reduce misunderstanding and time spent

· To digitize the whole system

Ø This project is planned to be done within the duration of this semester

Ø The target of this project is to reduce problems that happen during entry and exit carrying laptops and increase efficiency of the system

Cost

Ø Most of the cost expending materials already exists within reach of the organization. (Working computers, ID scanner etc.)

Ø The additional cost will be the up-to-date price of materials setup for putting up a connection between the gates and the main hub of the organization in addition to training the manpower required to operate the system.

- For trainer (a minimum cost of 1500 ETB)

- For trainees (a minimum cost of 300 ETB per trainee)

Deliveries required

Ø Fast and efficient student pc check in/out management system

Ø Easy and understandable user interface

Ø Insuring better student pc security throughout the campus

Milestone

Ø Project title submission – January 9, 2023

Ø Expected database design completion - January 19, 2023

Ø Expected database implementation- January , 2023

Limitation/constraints

Ø The limitation of this system is that it can't be operated without a person with the knowledge of the database

Ø Initial cost is greater than traditional system

Ø May need to upgrade regularly

Ø Management complexity

Scope exclusion

Ø Training is not provided by the database developers

Ø No interactive application(software) is developed during this project, only the Graphical User Interface and database is built

Ø No funding is provided by the database developers

5.Project Benefits

Ø The benefit of this system is to everyone who interacts with it directly or indirectly, the drawback is that it will need skilled manpower and more cost to set up initially

ü **To the organization and user**

- It reduces data duplication

- Reduce time and energy wasted due to mistakes and misinformation

- Makes data more understandable

- Data quality Improved due to reduction of mistakes

- Data security assured

ü **To the practitioners (the student)**

- Experience in developing Java System with a database system

- Makes laptop check in/out process easier and smoother

- Students feel more secure with their laptops inside the campus

- Provides confidentiality to students regarding their private information stored in their personal computers

6.Methodology

Ø The hardware technology we used is paper, pen, and laptop. The software technologies we used are Microsoft Word, My SQL, web browser (google chrome) and MS access and Cloud storage (if necessary).

7.Requirements

A.Functional Requirements

1. User authentication: Users must be authorized to access the system in order to initiate laptop checkout processes.

2. Automated check-out process: The system should allow users to quickly and efficiently select a laptop and have it automatically checked out via barcode scanning or RFID.

3. Reporting capabilities: The system should provide detailed reports on all check-outs, late returns and overall usage of the laptops.

4. Restrict access by location: Administrators should be able to restrict access to certain areas for students attempting to check out a computer outside of their designated location/building.

B.Non-Functional Requirements

1. System shall have a user login process so each user can access only their own account information

2. System shall be secure and maintain the privacy of personal data

3. System shall include an easy-to-use interface for students to check out laptops quickly

4. System shall allow multiple users to access the checkout system at the same time without performance issues

5. System shall track laptop inventory levels and provide notifications when supplies are low

6. System shall generate an automatic email notification to both student and administrator upon successful checkout of a laptop

7. System shall provide administrators with a view of past, present, and future laptop checkouts

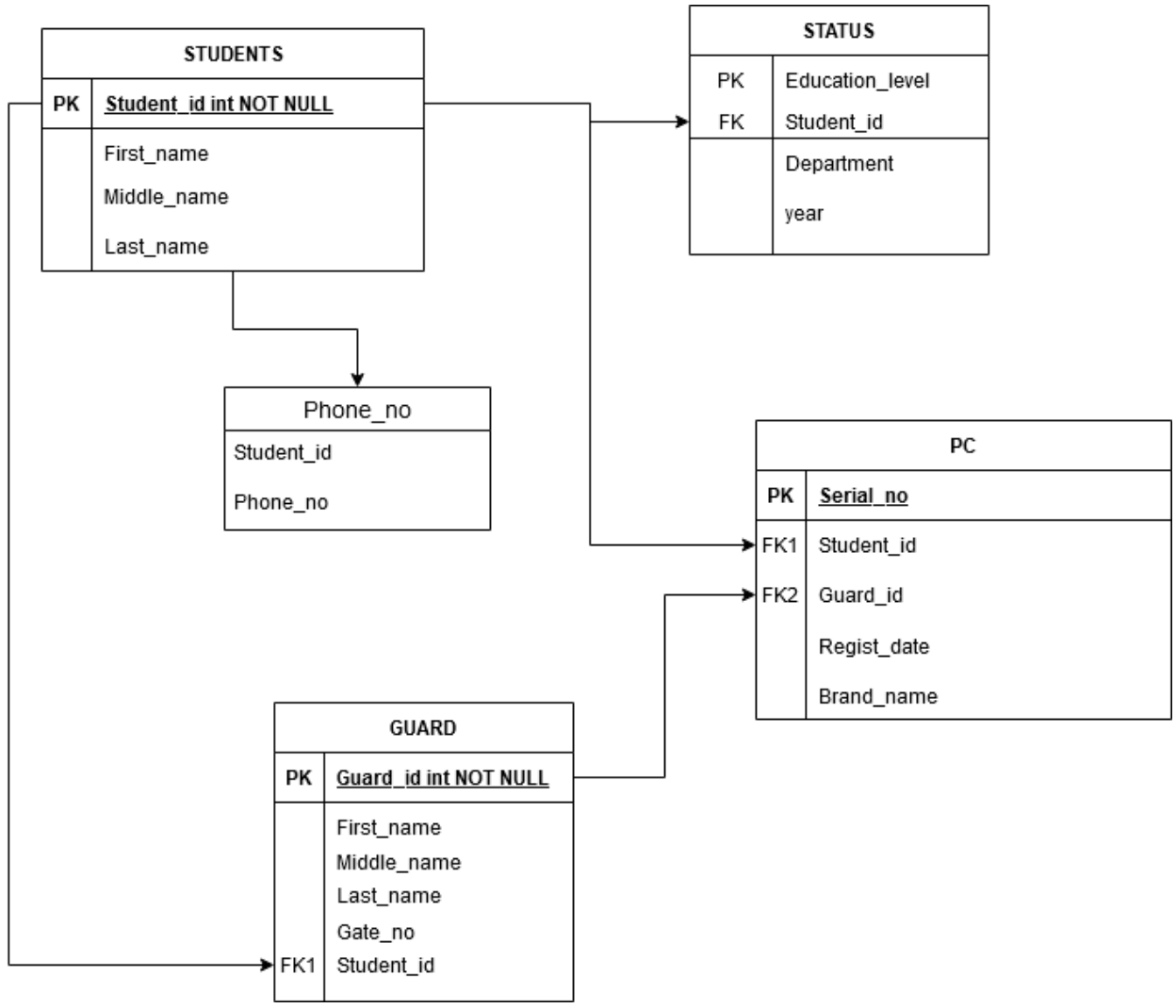
8. System security features should include password encryption and two factor authentication practices

9. System should be able to integrate with other existing systems or student databases

10.System should provide automatic alerts when predetermined loan conditions or exceedances occur

8.Database Design

Logical Design



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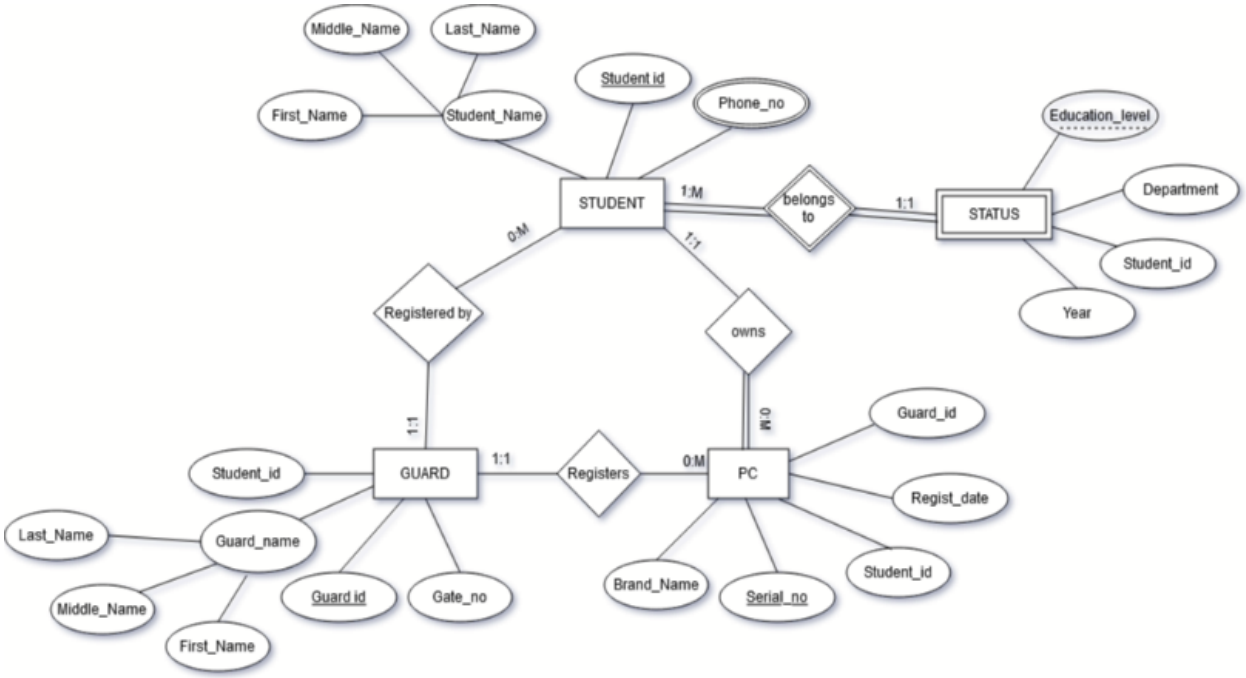
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