

King Abdulaziz University
Department of Computer Science
Faculty of Computing and Information Technology
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Date	Version	Description	Authors
	0.1		
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Project team

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Phase 1: Project Description

1.1. Introduction

A good education makes an individual develop personally, socially as well as economically. Education helps us to do our daily life activities in the best possible ways. also to acquire new skills and knowledge that will impact our development in life.

From the other side, some people suffer from health problems prevent them from merging with healthy persons in educational environments, such as loss of hearing or sight or autism. So, the community members give them a special care.

It is the responsibility of society to provide the appropriate environment for their health problem. Thus, this project would be an easier way for people with special needs to attend the appropriate learning environment for them.

1.2. Project organization

At first, we will present the idea of the project and the problems we want to solve it. Furthermore, the proposed solutions to these problems. Also, define the project goals, and make a clear idea of what is included in the project and exclude. Then we will move into the next stage to determine the requirements for the project, and the necessary data collection for analysis it. In the third phase, we will design the UML class diagram with its relations. The designing of the Sequence diagram, State diagram and Activity diagram it will be in the fourth phase. Finally, we will test the performance of the project.

1.3. Problem Description and Propose Solution

Describe the problem:

- ❖ Students with disabilities side:
 - The registration process at the school is not easy for people with disabilities. They have to show up at the education department and waiting a long time for their turn.
- ❖ Special education side:

- The department of special education does not have a website to allow people to schedule appointments electronically. They always do it manually and it is time-consuming.
- The student of disabilities does not has a shared record in the system of the special education department. So, if a student moved from one center to another for any reason, the record should be moved manually.

Plan to solve this problem:

providing a system has all needed services for the students with disabilities such as registering at school, booking an appointment and keeping track of their history and results.

1.4. Goals and Scope

1.4.1. Project Goals

Developing the organizational structure for special education and improving the systems and admissions procedures for students of all levels of education. Also, activate the special education department role in cooperation and coordination with the relevant parties In order to unite efforts and multiply and intensify them in favor of education for people with special needs.

The education system for people with special needs seeks to

- Saving time and effort
- Low cost
- Increase performance

1.4.2. Project objectives

Objective 1: Organizing the relationship between families, centers and schools.

Objective 2: The users can know the closest schools to them. furthermore, the services which the schools offer for them.

Objective 3: Reducing the academic delay of the disabled students.

Objective 4: Display all schools in case the student has a desire to move to another school.

Objective 5: Increasing the performance of existing systems to a system with more seamless and serves the user.

Objective 6: Increase their motivation towards education and towards forming social relationships and developing a sense of self-worth.

Objective 7: Increase the proportion of learners with special needs.

1.4.3. Project Scope

The project is the link between the Special Education Department, Centers of measurement and diagnosis, general government schools, and disability centers on one platform.

In order for disabled persons to join the appropriate School.

The system includes all disabled data in addition to the reports that required for approval. furthermore, the possibility of booking an appointment in Centers of measurement and diagnosis to do tests.

Once the requirement was completed it will be provided to Ministry of Education with minimal resource and avoid goes over budget.

The system will be applicable at the end of 2019 to being set out in the National Transformation Program 2020.

1.4.3.1. Included

The project is guided to special education Department in Jeddah, and it's includes physical disability, intellectual disability, Learning Disability, Autism , and Down Syndrome of both sexes aged between (6-18)years. Also, it is cover all governorates.

1.4.3.2. Excluded

The project does not include all disabilities and ages.

Phase 2: Business Requirements Specifications

2.1. Domain Analysis

A. Introduction

The domain is student with special needs. The motivation is to develop System which assisting student to enroll schools followed by the ministry of education. Furthermore, appointment scheduling for centers of diagnosis.

B. Glossary

Much of the terminology for this domain its about registration and appointment scheduling which is known for public. But, there will also be special terminology related to disabilities domain:

- The tests performed for diagnosis.
- The type of disability.
- The names of the centers.

C. General knowledge about the domain

We have known more about the domain from Special Education Department and have been a known the current procedure and what they are looking improved for in the future!

D. Customers and users

Student : who can book appointment and register in schools.

Visitor : who use the services provided by the system.

E. The environment

Families of disabilities whose have a smart phones with any platform.

F. Tasks and procedures currently performed

1. Visitors view :

The visitor can use support service even if he did not have an account.

2. Student view :

- See the regulations of special education department and the educational aids.
- Enroll in schools.
- Use appointments services in measurement and diagnostic centers.
- Submit a complaint or suggestion.
- Contact with the department of special education.

G. Competing software

The system was use the same methodology:

- Qabas system.

H. Similarities to other domains

There are many systems use the same methodology in different domains, these are some of them:

- Qyas system.
- Absher system.
- Saudi airlines system.

2.2. System's Stakeholders

Diagnostic Centers : The places where the test operated.

Ministry of Education: It contains the database of schools.

Department of Special Education: The organization concerned with the education of people with special needs.

Disability student : They are the ones who depend on the system and use it

Project team: The software designers who will work on the designing and programming of the system.

2.3. Technical for gathering data :

We used two ways for collection the information about our topic:

1- Interviews

Since the goal of Doullany System is facilitating access of families with special needs to the department of special education, we have conducted interviews (see Appendix) with both sides. We took this step to be aware of their views and needs.

The person being interviewed	Summary of the interview
Ekhlas Al Sawaf - Director of special Education in Jeddah	Please refer to the minutes of the interview (see Appendix)
Najat Azrai - Special Education Supervisor	
Fawzia Al Ghamdi - Member of The Saudi Association of Special Education (GESTER) and Mother of child with mental impairment	She explained to us the suffering of mothers in searching for the appropriate school

Munira Al Ghamdi - Holds a master's degree in Autism and mother of child with Autism	She explained to us the suffering of mothers in performing diagnostic tests
Safaa - Sister of child with health impairment	She talked about the problems in general
Noor - Mother of child with attention deficit hyperactivity disorder(ADHD)	She explained to us problems that come after registration that may lead to the student leaving the school
Reem - Mother of child with Autism	She talked about that mothers may rely on private teachers for not knowing the available public schools and the high prices of private schools

2- competing System

The idea of the Qabas system and the mechanism of its work has similarity between Doullany System, with additional features in Doullany System. Here some difference between them:

- Doullany System and Qabas both are affiliated to the Ministry of Education. But, Qabas In madinah and Doullany covered all governorates of the Kingdom.
- Doullany System and Qabas both are an electronic services system for special education. However, Qabas for girls and Doullany for both sexes.
- Doullany System and Qabas both are Provide a list of available schools.
- However, Doullany System provides the services available at these schools.
- Doullany and Qabas both are provide support services.

2.4. Functional Requirements

R1: Doullany System shall allow the user to create account in the system.

R1.1: Doullany System shall allow the user to enter first name.

R1.2: Doullany System shall allow the user to enter middle name.

R1.3: Doullany System shall allow the user to enter last name.

R1.4: Doullany System shall allow the user to enter national ID.

R1.5: Doullany System shall allow the user to enter age.

R1.6: Doullany System shall allow the user to enter nationality.

R1.7: Doullany System shall allow the user to enter gender.

- R1.8: Doullany System shall allow the user to enter phone.
- R1.9: Doullany System shall allow the user to enter email.
- R1.10: Doullany System shall allow the user to enter location.
- R1.11: Doullany System shall allow the user to enter password.
- R1.12: Doullany System shall allow the user to confirm password.
- R1.13: Doullany System shall allow the user to enter type of disability.
- R2: Doullany System shall allow the user to log in system.
- R2.1: Doullany System shall allow the user to enter the national id.
- R2.2: Doullany System shall allow the user to enter the password.
- R3: Doullany System shall allow the user to use the appointment services.
- R3.1: Doullany System shall allow the user to book a new appointment.
- R3.1.1: Doullany System shall allow the user to do psychological diagnosis.
- R3.1.2: Doullany System shall allow the user to do linguistic diagnosis.
- R3.1.3: Doullany System shall allow the user to do social diagnosis.
- R3.1.4: Doullany System shall allow the user to choice the appointment date and time.
- R3.1.5: Doullany System shall allow the user to choice the appointment location.
- R3.2: Doullany System shall allow the user to change the appointment.
- R3.2.1: Doullany System shall allow the user to change diagnosis type.
- R3.2.2: Doullany System shall allow the user to change the time.
- R3.3: Doullany System shall allow the user to cancel the appointment.
- R3.4: Doullany System shall allow the user to view and print the appointment.
- R3.5 : Doullany System shall check if the user is diagnosed.
- R3.6: Doullany System shall check appointment date and time and location availability.
- R4: Doullany System shall check the diagnosis result.
- R4.1: Doullany System shall allow the user to view diagnosis report.
- R4.1.1: Doullany System shall display the result of diagnosis is under processing.
- R4.1.2: Doullany System shall display the result of diagnosis.
- R4.2: Doullany System shall allow the user to print diagnosis report.
- R5: Doullany System shall allow the user to join at school.
- R5.1: Doullany System shall allow the user to join at new school.
- R5.2: Doullany System shall search and display the appropriate schools for the user.
- R5.3: Doullany System shall allow the user to choose a school.

- R5.4: Doullany System shall check seats availability.
- R5.5: Doullany System shall allow the user to confirm the request.
- R6: Doullany System shall provide support services.
- R6.1: Doullany System shall the user to make suggestion.
- R6.2: Doullany System shall allow the user to lodge a complaint.
- R6.3: Doullany System shall allow the user to enter Full name.
- R6.4: Doullany System shall allow the user to choose service title.
- R6.5: Doullany System shall allow the user to enter e-mail address.
- R6.6: Doullany System shall allow the user to write a complaint.
- R6.7: Doullany System shall allow the user to write a suggestion.
- R6.8: Doullany System shall allow the user to save and submit the service.
- R6.9: Doullany System shall provide the user with teaching aids.
- R6.9.1: Doullany System shall provide the user supported links.
- R6.9.2: Doullany System shall provide the user supported document.
- R6.10: Doullany System shall provide a list of all regulations.
- R6.11: Doullany System shall allow the user to contact with the support team.
- R6.11.1: Doullany System shall allow the user to contact with the support team by e-mail.
- R6.10.2: Doullany System shall allow the user to contact with the support team by phone call.
- R7: Doullany System shall allow the user to log out the system.
- R8: Doullany System shall allow the user to move from one school to another.
- R8.1: Doullany System shall display the current student's school.
- R8.2: Doullany System shall write the move reason.
- R8.3: Doullany System shall verifying the move reason.
- R8.4: Doullany System shall search and display the appropriate schools for the user.
- R8.5: Doullany System shall allow the user to choose a school.
- R8.6: Doullany System shall check seats availability.
- R8.7: Doullany System shall allow the user to confirm the request.

Table of Requirements Allocation :

Functional Cluster	Functional description	System requirement	Functional subsystem identified
System services access	This functional allow the user to use the system services	R1,R1.1,R1.2,R1.3,R1.4,R1.5 R1.6.....R1.13,R2,R2.1,R2.2	Create Account login
appointment services	This functional allow the user to make diagnosis appointment	R3,R3.1,R3.1.1.....R3.1.5,R3.2,R3.2.1,R3.2.2 R3.3,R3.4,R3.5,R3.6	New appointment Cancel appointment Rebooked appointment Change appointment Check availability
School enrolling	This function allow the user to enrol at school or transfer from school to nother	R4,R5,R5.1,R5.2,R5.2.1,R5.3,R5.4	Check diagnosis result. Search for school Check seat availability Verifying transfer reason
Support services	This function allow the user to make suggestion or complaint	R6,R6.1,R6.2,R6.3,R6.4,R6.5,R6.6,R6.7	Make Suggestion Make complaint

2.5. Non-Functional Requirements

R1: Doullany System shall make the user choose password strong enough to protect personal information and maintain security, by making the password 8 digit long and mix of numbers and characters.

R2: Doullany System shall give a confirmation after each submission.

R3:Doullany's System recovery time must not exceed two seconds after the system failure.

R4: Doullany System shall login a customer within 3 seconds.

R5: Doullany System shall be available 24 hours.

R6: Doullany System shall provide users friendly interfaced and easy usages.

R7: Doullany System shall be available in English and Arabic.

R8: DoullanyApp shall run on any platform.

2.6. Utilize Use Case Model

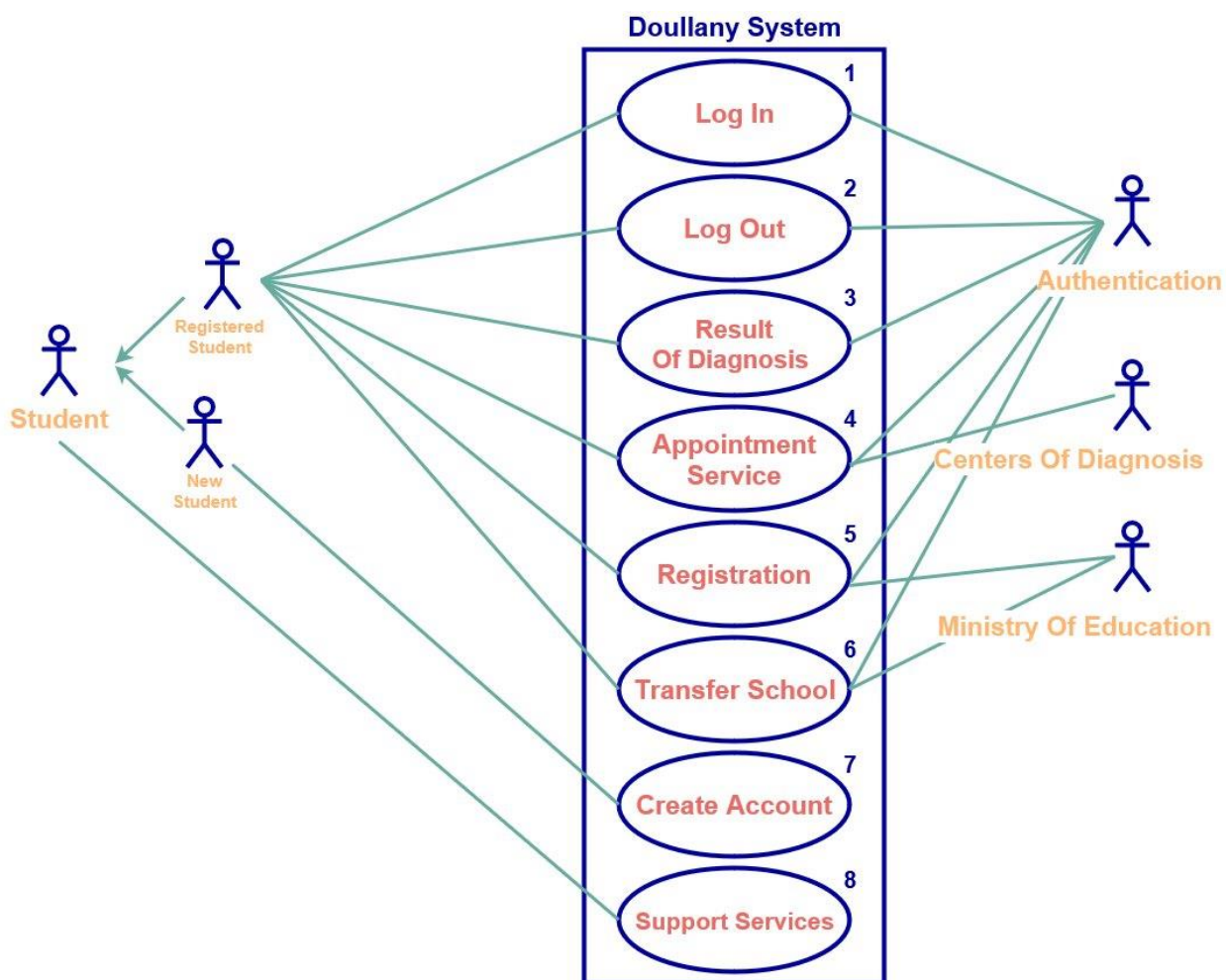


Table of Requirements-Use Case Traceability Matrix:

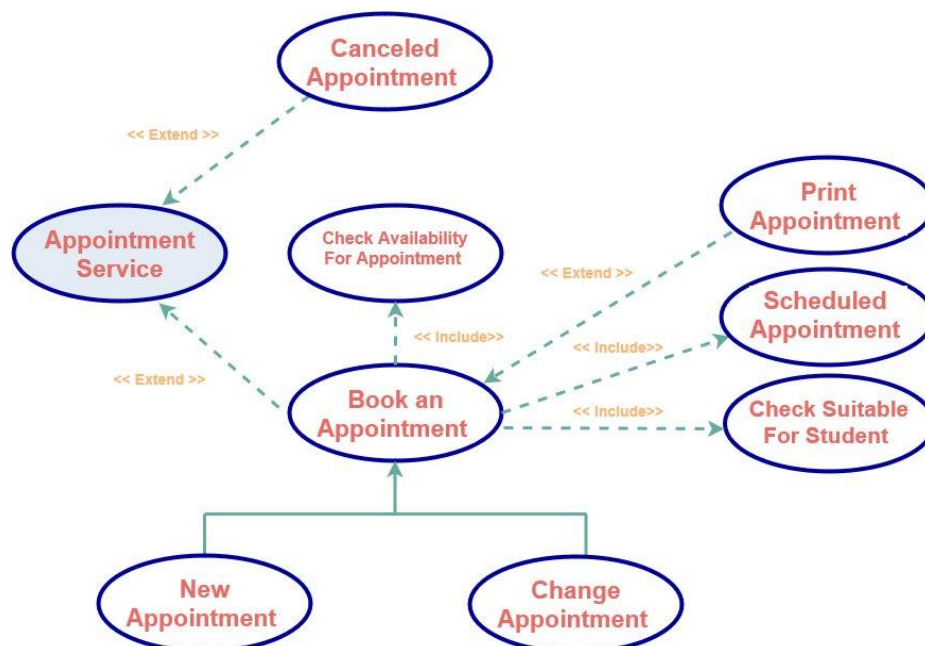
	Priority weight	UC1	UC2	UC3	UC4	UC5	UC6	UC7	UC8
R1	1	X							
R2	2		X						
R3	3				X				
R4	4							X	
R5	5					X			
R6	7						X		
R7	8			X					
R8	6								X
score		1	2	10	3	5	24	4	6

2.7. Two main use case descriptions

The first use case :

Name : Appointment service #4

Actors: Registered Student, Authentication and Centers Of Diagnosis.



The second use case :

Name : Registration #4

Actors: Registered Student, Authentication and Ministry of Education.

**Table of Business Process, Step, Operation and Action :**

Application	Use case	Steps/Operations	Action
Doullany App	New appointment	Open available appointment	Click Appointment button
		Appointment region	Click region, choose region
		Appointment center	Click center, choose center
		Appointment date	Click date, choose date
		Appointment time	Click time, choose time
		Book appointment	Choose Appointment, select book button
		Print Appointment	Click print button
	Change appointment	Open booked appointment list	Click student appointment list, select appointment
		Change appointment	Click change button
		Appointment region	Click region, choose region
		Appointment center	Click center, choose center
		Appointment date	Click date, choose date
		Appointment time	Click time, choose time

		Book appointment	Choose Appointment, select book button
		Print Appointment	Click print button
	cancel the appointment	Open exist appointment	Click open Appointments, select appointment
		Canceled appointment	Click canceled, Confirm deletion
	Registration	Choose region	Click list, choose region
		Choose schools\centers	select schools\centers
		register	click register button

Phase 3: Design and Structuring

The previous main two Use Cases from phase 2:

- 1- Appointment Service
- 2- Registration

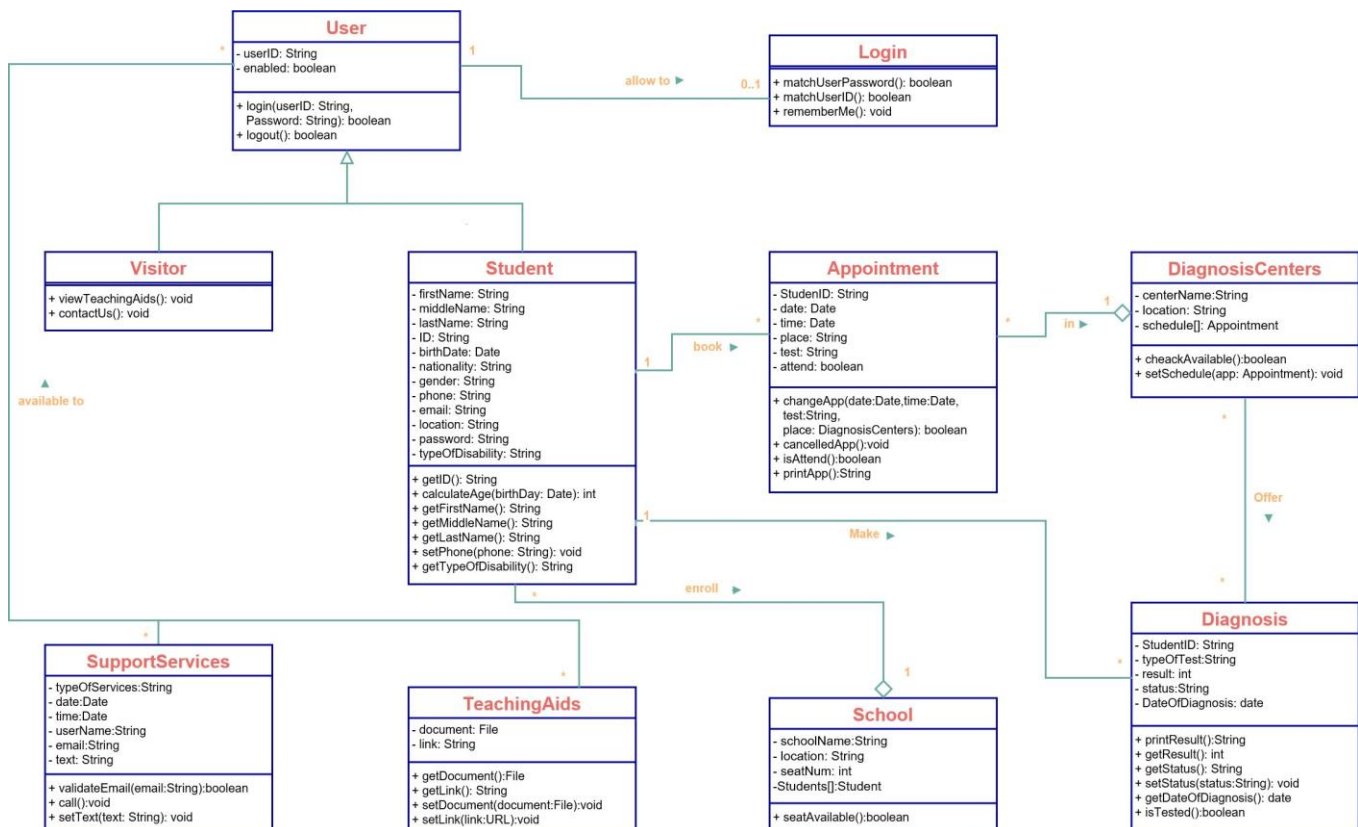
3.1. Converting use cases to class diagram

3.2. UML class diagram

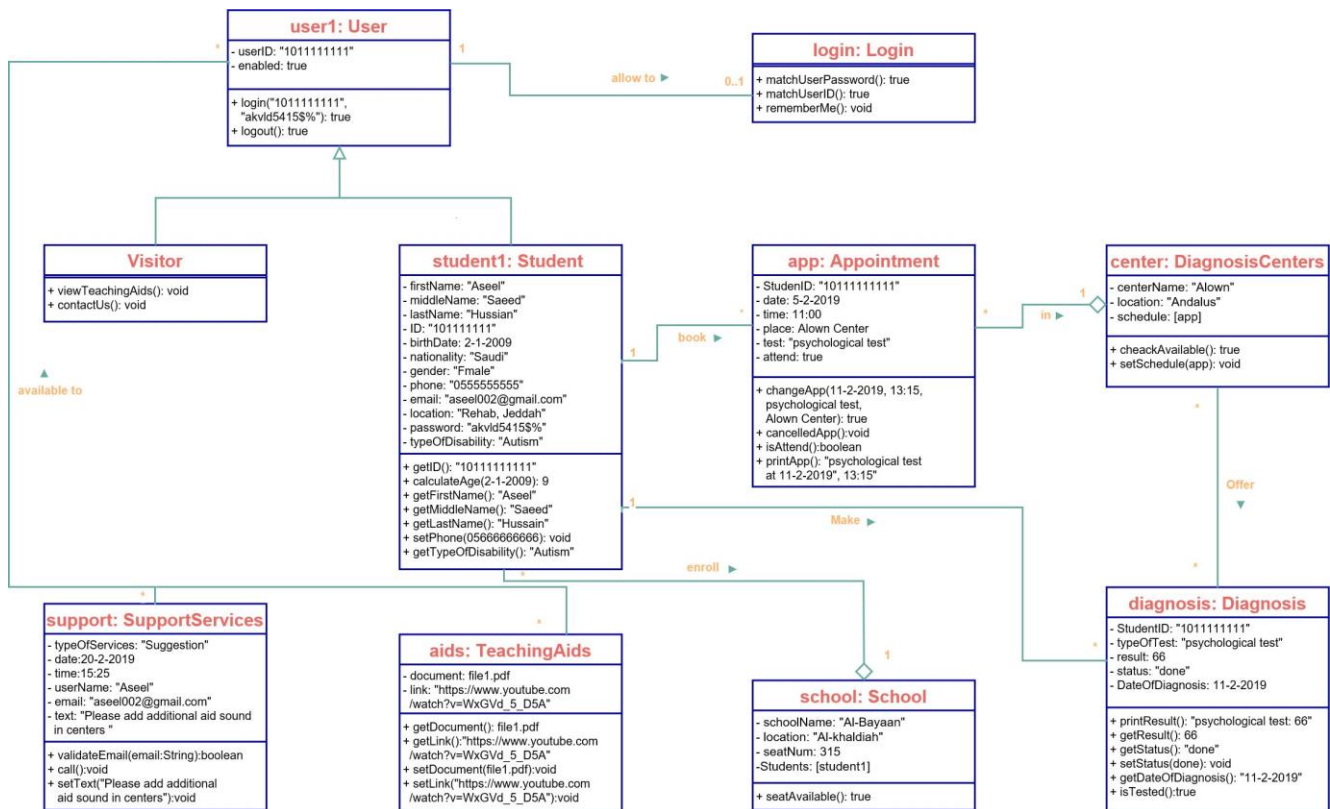
3.2.1. Association

3.2.2. Multiplicity

3.2.3. Generalization



3.2.4. Object diagrams



3.3. Difficulties & risk when creating class diagram

The major problems we have encountered in this phase:

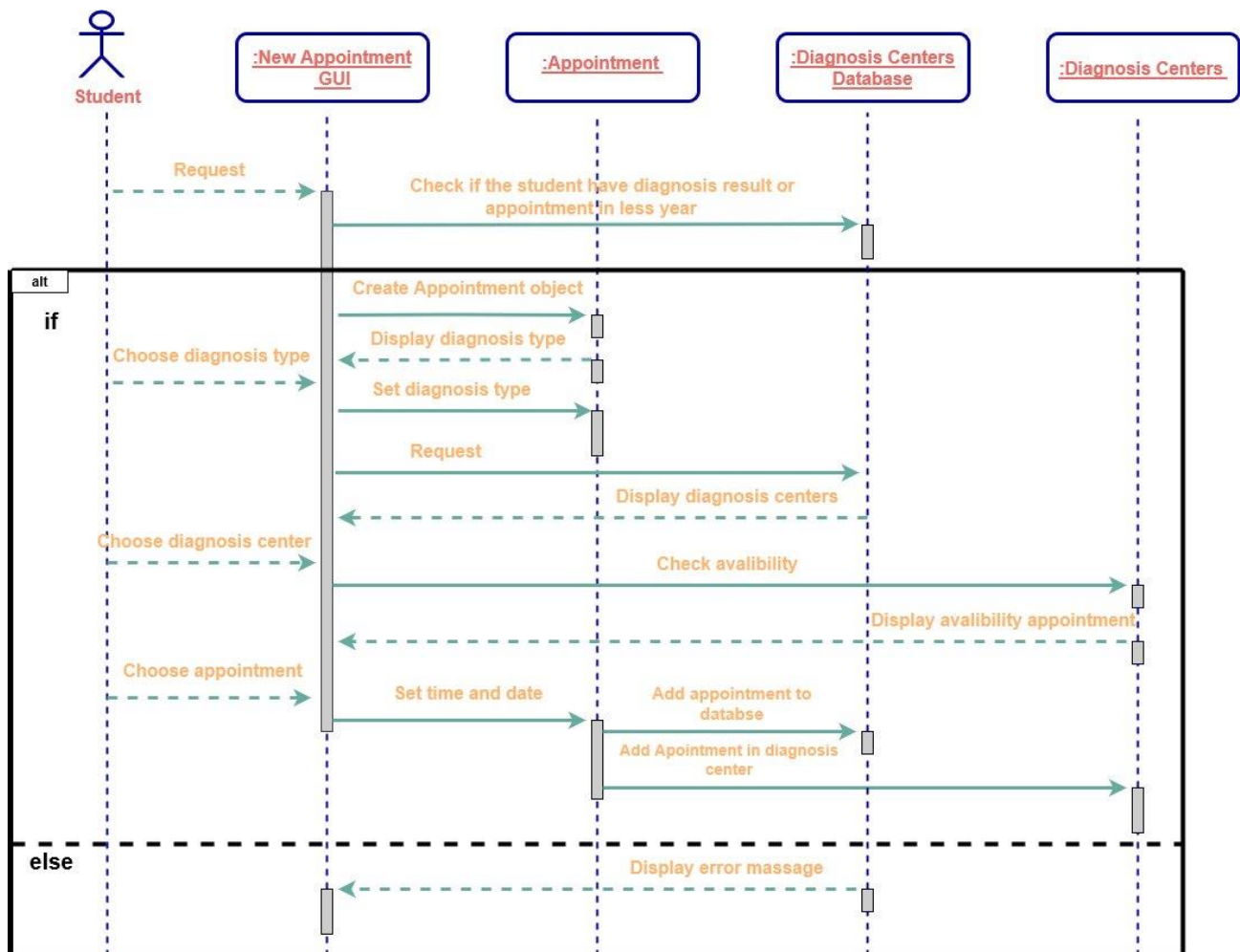
- Modeling is particularly difficult skill and have thinking at the appropriate level of abstraction.
- Put the methods in the appropriate class.
- little change in a specific class may request many change in other class.

Phase 4: Modeling, Interaction & Behavior

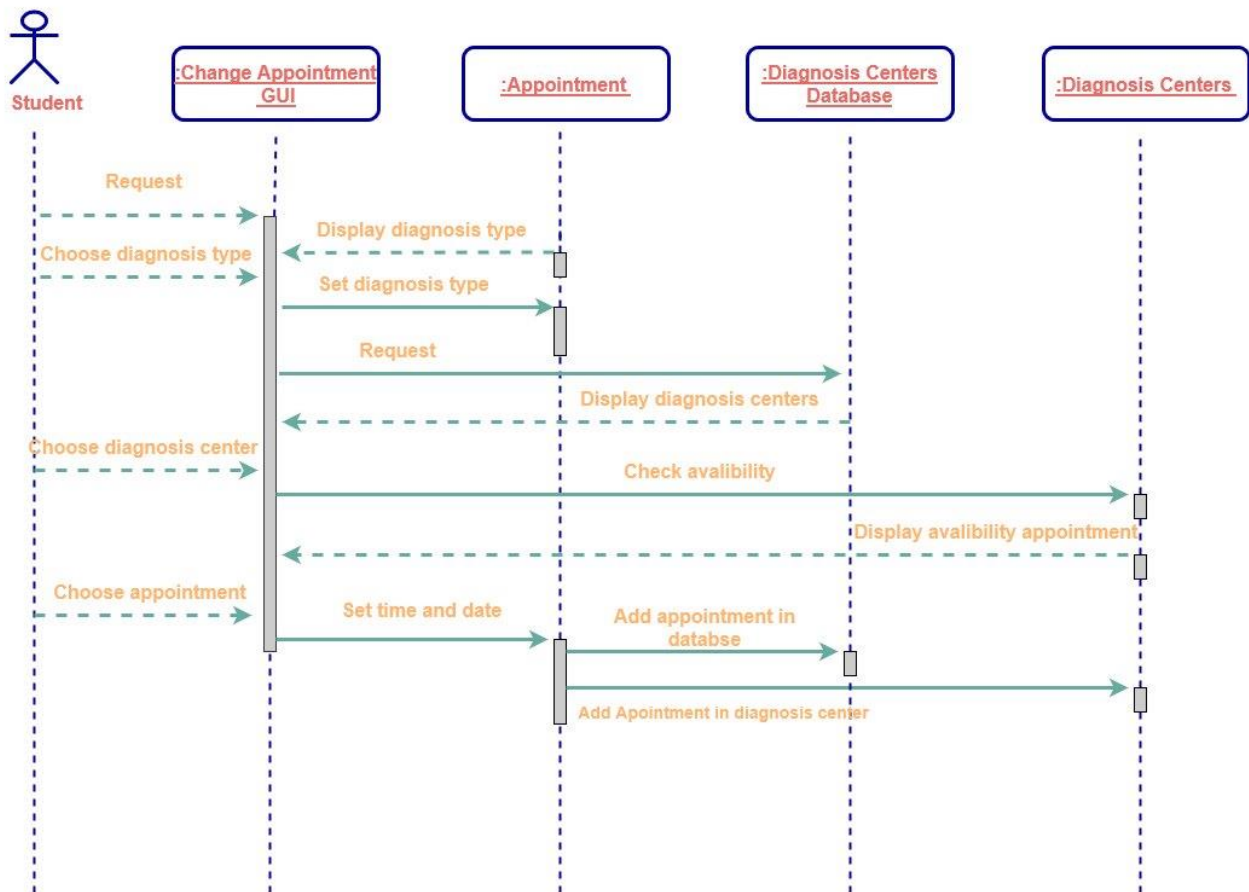
4.1 Sequence diagram

❖ Appointment Service

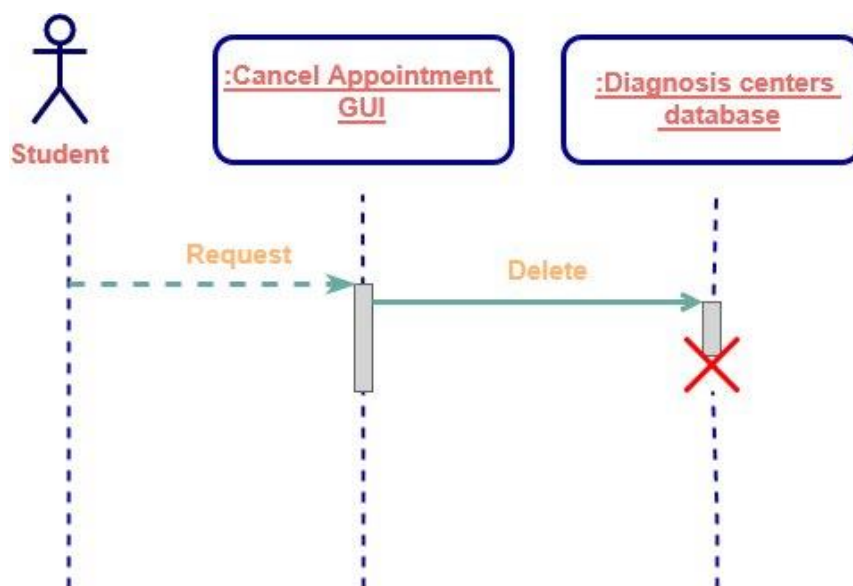
- Book a New Appointment



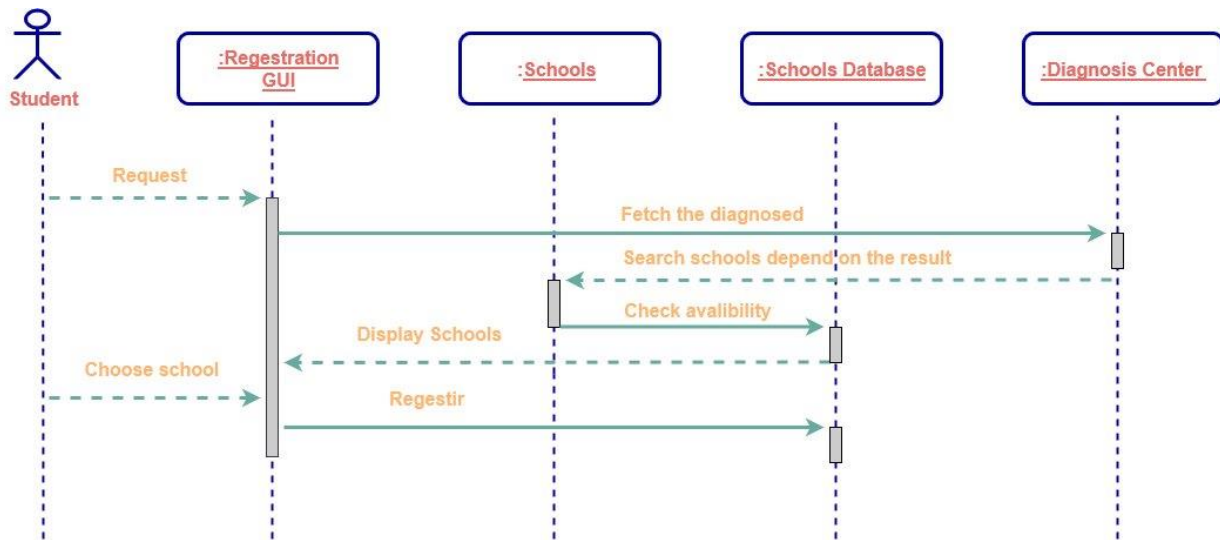
– Change an Appointment



– Cancel an Appointment

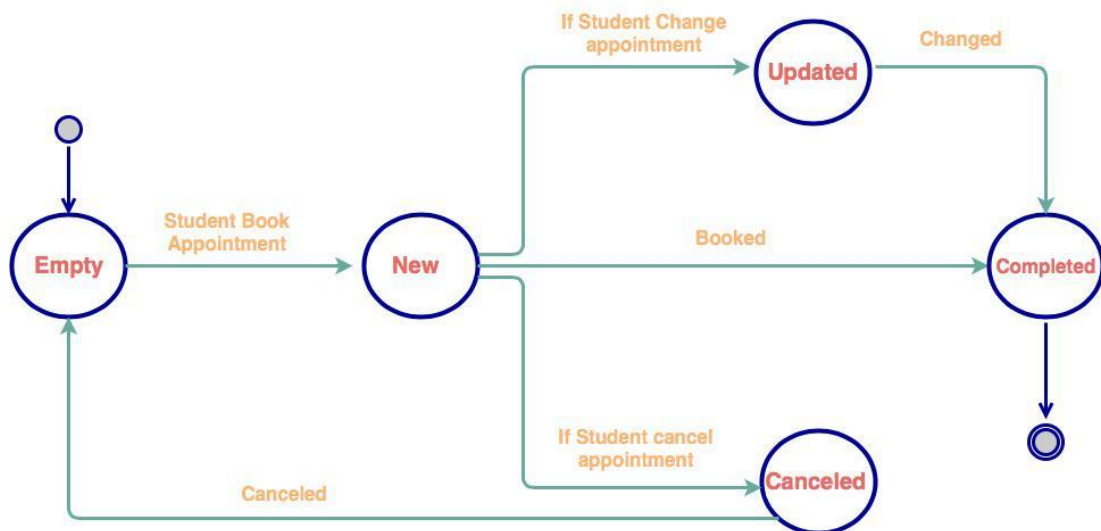


❖ Registration

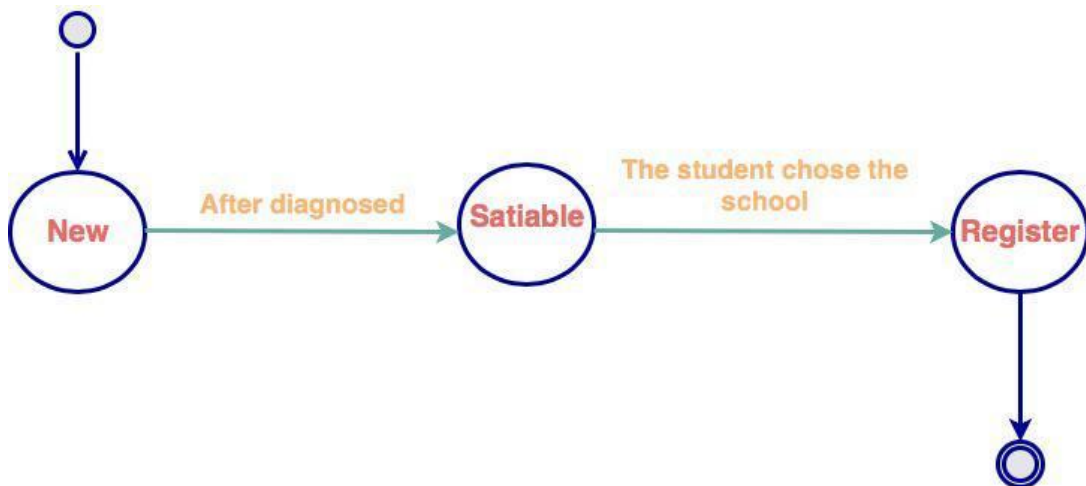


4.2 State diagram

❖ Appointment Service

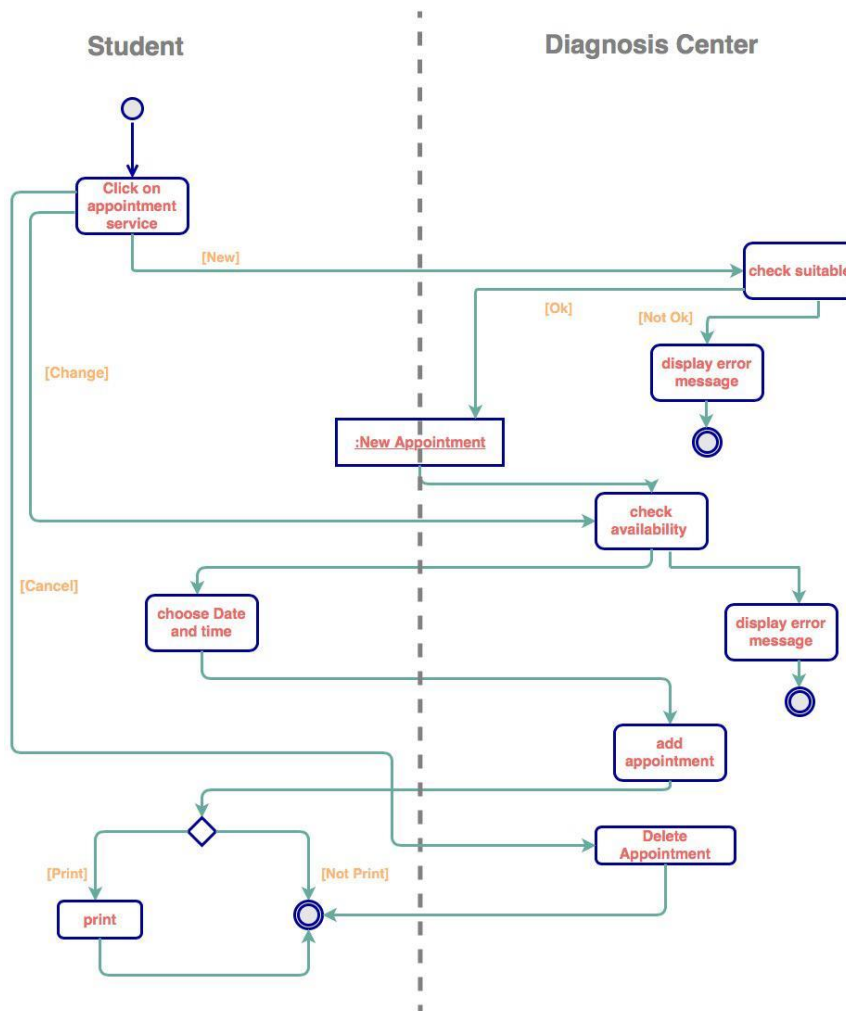


❖ Registration

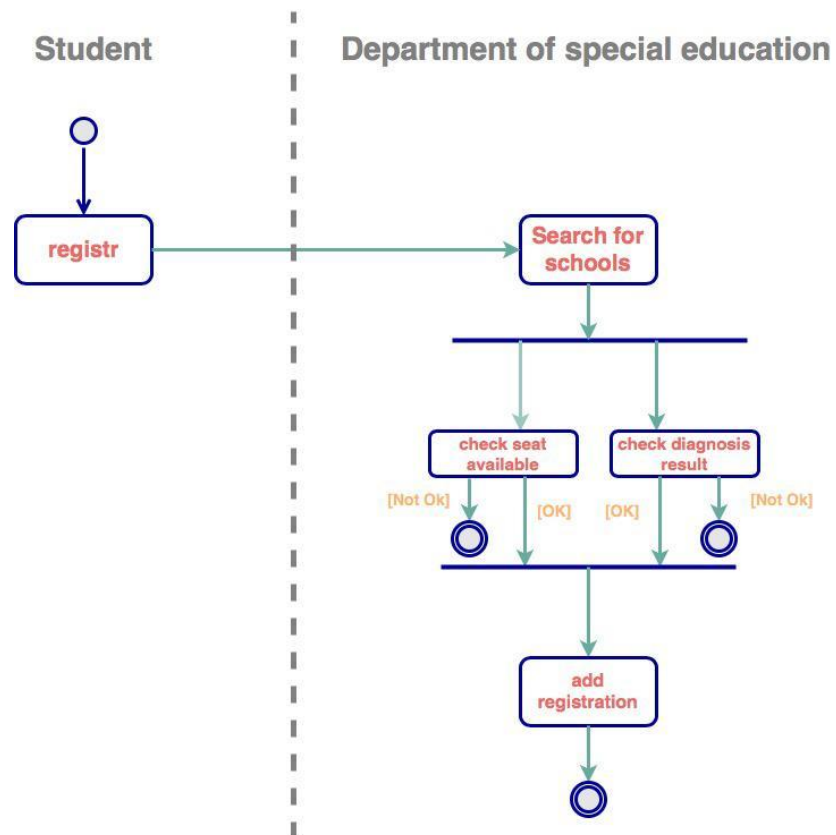


4.3 Activity diagram

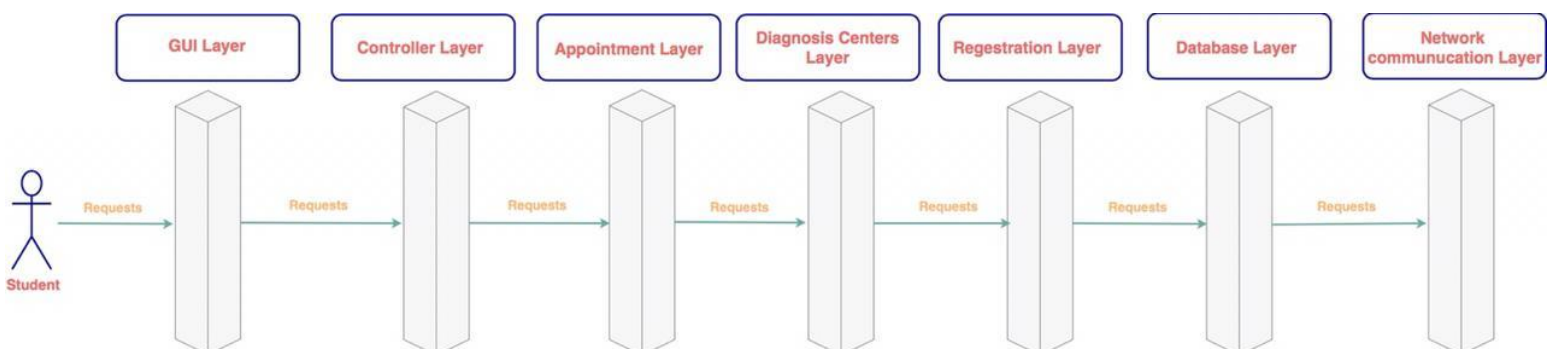
❖ Appointment Service



❖ Registration



4.4 System Architecture



4.5 Difficulties & risk in this phase

The major problems we have encountered in this phase:

- Work iteratively:
 - Develop initial class diagrams, use cases, interaction diagrams and state diagrams.
 - Then go back and verify that all of these are consistent, modifying them as necessary.
- Drawing different diagrams that.
- capture related, but distinct, information will often highlight problems.

Phase 5: Testing

5.1. Testing Objective

The purpose of testing is to detect errors and undesired behaviors in our system and make sure that the result meets with the requirements of Disability students and the department of special education.

5.2. Testing strategy

We used black box testing to test functional requirements based on our System. We will test these three functionalities:

- Log in the system. (Mapped to R2).
- Use appointment services (Mapped to R3).
- Use support service ' write a complaint ' that the system provides it (Mapped to R6).

5.3. Approach

We will give the user this scenario to test our system by follow these questions:

- How many clicks a new user needs to log in?
- How many clicks a user needs to use appointment services by performing the required tasks?
- How many clicks a user needs to use support services that the system provides its? For example, make a complaint.

Test log in the system

After the user opens the application, click on log in. In case the user is not signed up, he won't be able to complete. If the user is signed un, the log in process will be completed successfully.

- o Input of this test (National ID)
- o Source (User)
- o Output (The validity of the information entered).

Conditions	National ID	F	T	F	T
	Password	F	F	T	T
Actions	Expected result	Error : Please enter the ID	Error : Please enter the Password	Error : Please enter the ID	Sine in processed

* The number of clicks that a user needs to log in the system are **4 clicks**.

Test use appointment services

When the user wants to use this appointment service, first he opens the application, he must be sine in or sign up to complete, if he sine in he will choose the new appointment , choose the type of diagnosis, then click next, choice the appointment location and center and click next ,choice the appointment date and time and click next ,then print. The user will write a name, E-mail address, number of phone, address and his complaint. At the end, he clicks the send button to complete the request offer process.

* The number of clicks that a user needs to complete the previse tasks are **9 clicks**.

Test write a complaint

When the user wants to use this support service that the system provides it, first he opens the application, choose the electronic services, then a list of services will appear, he will click on the Support Services which navigate him to this service page. The user will write a name, E-mail address, number of phone, address and his complaint. At the end, he clicks the send button.

* The number of clicks that a user needs to use support services and write a complaint are **9 clicks**.

Appendix

Interview Questions:

- 1)What are the problems faced by students with special needs when registering in schools?
- 2)Why the performance of measurement and diagnostic tests is difficult?
- 3)What services should be available after registration?
- 4)What is your assessment of the Qabas system?
- 5)Are there additional suggestions?

Minutes

محضر اجتماع [مشروع دُلّني]

الموقع : الاداره العامة لتعليم البنات بجدة

التاريخ : ٣٠ سبتمبر ٢٠١٨

الوقت : الساعة ١٢ ظهراً

الحضور :

أ.إخلاص الصواف مديرة اداره التربية الخاصة بجدة
أ.نجاة أزري مشرفة تربية خاصة
و الطالبات نوره الحربي و لينة باحمدين و ريم السلمي

تمت المناقشة حول :

- نظام يهدف إلى تنظيم العلاقة بين الأهالي و بين المدارس و المراكز المخصصة لذوي الاحتياجات الخاصة و قد تم حصر المتطلبات إلى :
- ١- إنشاء حساب للطالب عن طريق رقم السجل المدني.
 - ٢- تحديد موقعه و نوع احتياجه.
 - ٣- حجز موعد في اختبار التشخيص و القياس.
 - ٤- ظهور النتيجة إلكترونياً.
 - ٥- توجيهه إلى أقرب مدرسة مناسبة.
 - ٦- توفير الخدمات الإلكترونية و الخدمات المساندة للتعليم.

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[2] Ministry of education. 2018. SPECIAL EDUCATION. Retrieve from <http://cutt.us/F5p4W>