



A Compact System as a Software Organization of an Intelligent Computer Communication

Frank Appiah

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A Compact System as a Software Organization of an Intelligent Computer Communication.

FRANK APPIAH , *Softgene Technologies Institute, Kumasi, Ashanti, Ghana.*

ABSTRACT.

This software analysis paper starts with a short introduction to a compact system as an organization to intelligent computer communication in the perspective of software system. The basic software analysis work-flow of AINRS is studied and investigated. In there, three models are used in studying the functioning of an ICC system mainly at the entity, dynamic and functional levels of the system. Finally, I design the organization of an intelligent computer communication.

KEYWORDS

ACMICC2017, intelligent; computer; communication; technology; database; telephony; system; messaging; language; entity.

1 INTRODUCTION

This paper will look at a compact system mainly the structure, composition of system and the software organization of automatic information retrieval system (AINRS). This is a small software system that brings the composition of computer communication system to an unimaginable decision or perspective. The structure of the system will begin with the analysis of the software that makes AINRS function to its correctness in section 2. The heart of the organization of automatic information retrieval system will beat in our exploration to intelligent computer communication(ICC). A compact system indeed but the definition of concepts here is broad and detail enough to replicate the software and build yourself an ICC. With an ICC system several solution application can be implemented. In section 3, the conclusion on the design of intelligent computer communication is made.

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2 OVERVIEW OF SOFTWARE ANALYSIS

The Java Programming language has come along a long way to be the most popular and well supported programming language available today. It provides support interfacing with hardware through the ports on the computer. It is a language that also has a lot of support for client server interactions and distribution of resources in such applications. The software analysis work-flow[7] investigates the Automatic Information Retrieval System (AINRS) , which is composed of various models each of which has specific and predefined sets of tasks. These model units are :

- Entity Class Model
- Dynamic Model
- Functional Model

This model can be regarded as the brain of this system. It houses all the primary but not specific methods that the system will need in order to understand and retrieve the necessary information the user requests for. However this unit is only an abstraction (an interface) that needs to be implemented in each case since the type of information needed by every type of application. For example in a school scenario user requesting for a CWA will have a different intelligence as compare to a user requesting for hotel reservations in a hotel scenario. As such the intelligence module (interface) will have a method such as analyse but will have different implementations for the above two scenarios.

2.1 Entity Class Modeling

An entity is an object that exists and is distinguishable from other objects. An entity set is a set of entities of the same type. An entity is represented by a set of attributes. Formally, an attribute is a function which maps an entity st into a domain. These entity classes are stored in the E-R (entity-relationship) database:

- Authenticator: A class that models the database which contains the authenticator objects for allowing or denying users of the system.
- Admin: A class that models the database which contains the administrative objects for accessing all permissions.
- Cwapoint: class that models the database that contains student information relating to cwa points.
- Timetable: class that models the database that contains student information relating to time table.
- Trail: class that models the database that contains student information relating to trail courses.
- GeneralInfo: A class that models the database which contains the generalinfo objects.

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- Student: A class that models the student in the database such details as first name, last name, index number of a student object.
- Registercourse: A class that models the student in the database with such details as the number of registered courses and their details.

A relationship is an association among several entities. On the other hand, a relationship set is a set of relationships of the same type. From the class diagram, there are relations like:

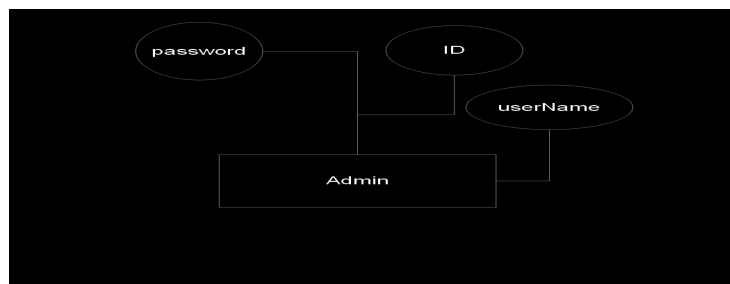
- A student has many registered courses. This is a one-to-many relationship.
- A registered course has a student. This is a one-to-one relationship.
- A registered course has a time table. This is a one-to-one relationship.
- A time table has many registered courses. This is a one-to-many relationship.
- A student has many cwa points. This is a one-to-many relationship.
- A cwa point has a student . This is a one-to-one relationship.

2.1.1 E-R Diagrams

The overall logical structure of a database can be expressed graphically by an E-R diagram which consists of the following components:

- Rectangles, which represent entity sets.
- Ellipses, which represent attributes.
- Diamonds, which represent relationship sets.
- Lines, which link attributes to entity sets and entity sets to relationship sets.

ADMIN DIAGRAM



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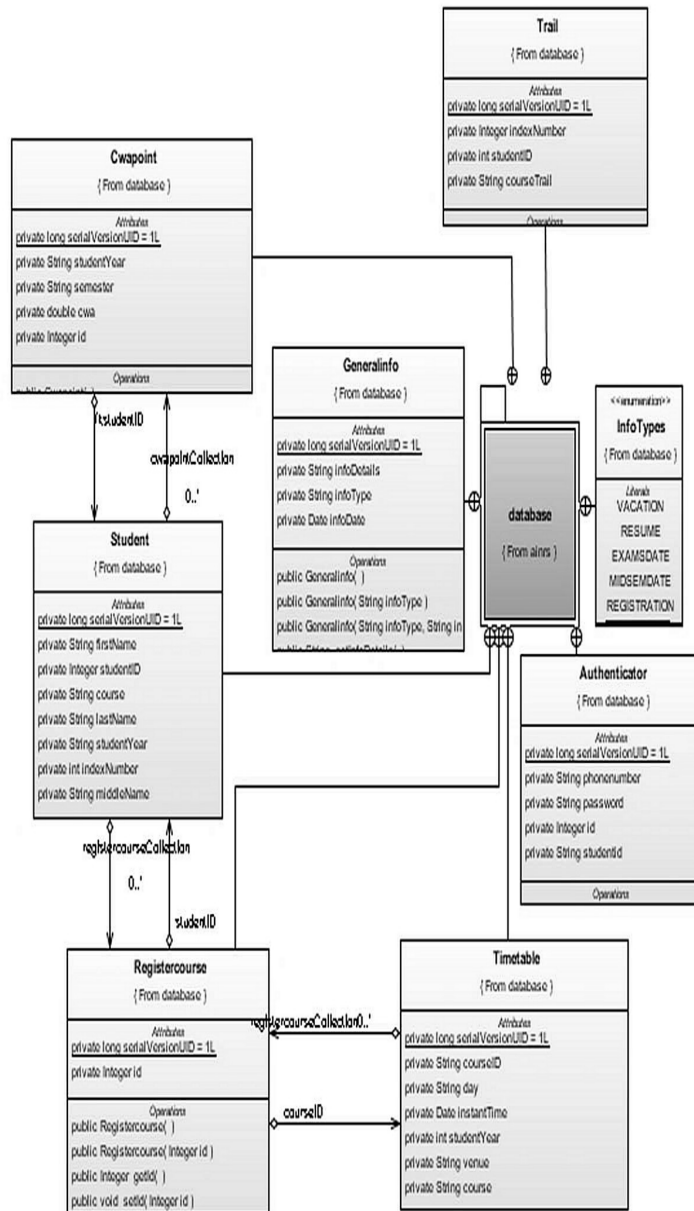
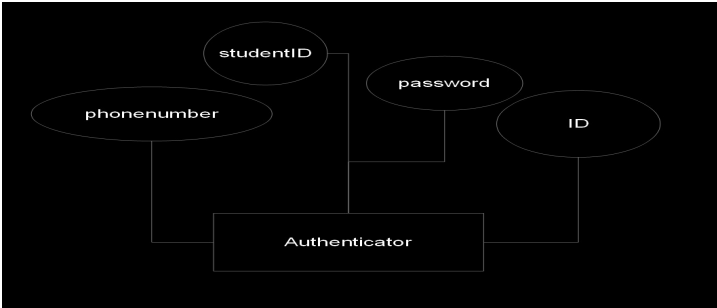


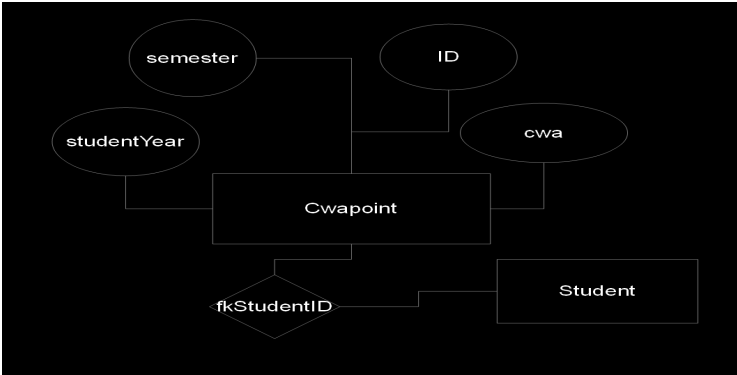
Figure 1: Class Diagram (Zoom: 200%)

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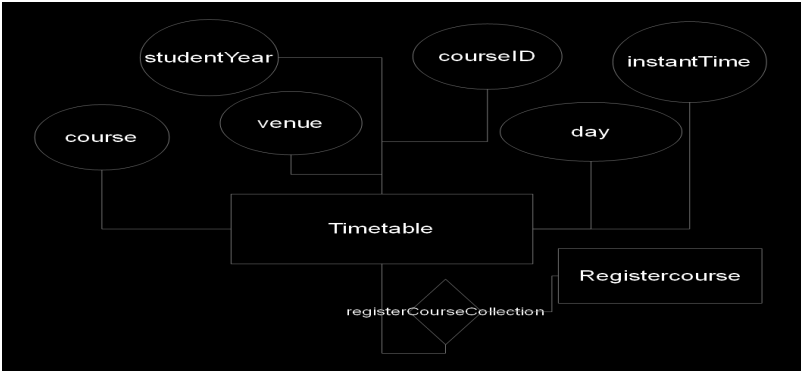
AUTHENTICATOR DIAGRAM



CWAPOINT DIAGRAM

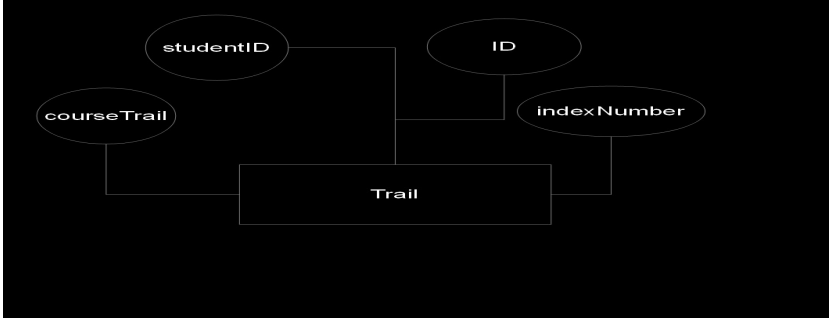


TIMETABLE DIAGRAM

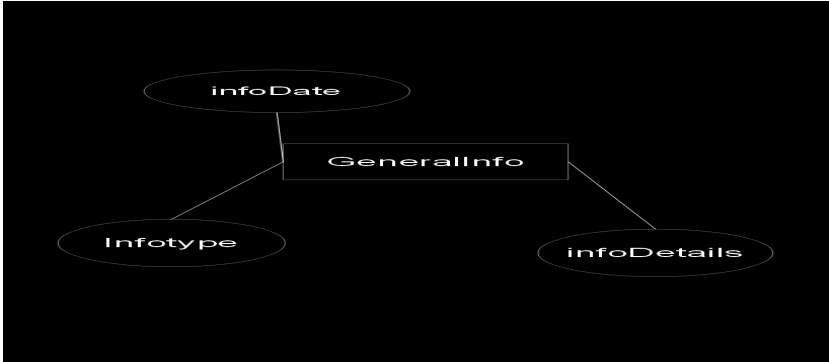


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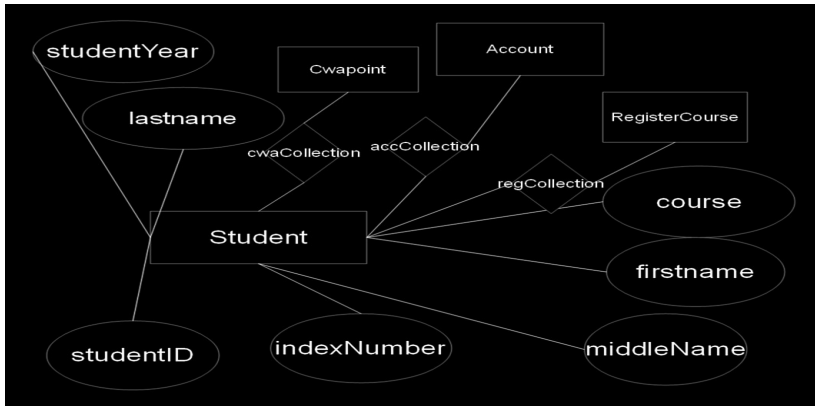
TRAIL DIAGRAM



GENERALINFO DIAGRAM



STUDENT DIAGRAM

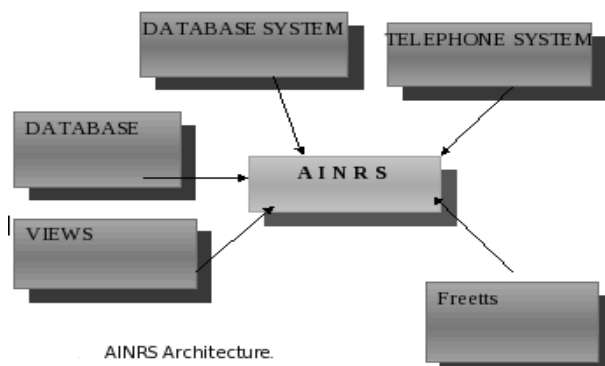


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The remaining entities namely smssvr_in and smssvr_out can be diagrammed as the same but we will leave it here for now.

2.2 Dynamic Modeling OF AINRS

AINRS is basically a system to which any specific application being implemented can be attached. Figure 1 is the class diagram illustrating the above relationships. The flow of communication in AINRS is very simple. When a call is made to the system either from a cellular phone or fixed line a connection is established with the telephone System. After the connection has been set-up and established, a set of instructions are played to the caller as to which combinations to press pertaining specific information by the Text-To-Speech manager. Inputs from the caller are received the DTMF recognizer in the telephone system. The inputs are then analysed by the appropriate intelligence and appropriate requests are sent to the database system from which the corresponding results are delivered to the telephone system. A structured message is constructed from the results and sent to the Text-To-Speech manager which is then played to the caller's hearing. On the other hand when a client sends in a short message, the mobile system detects that an inbound notification event has occurred. The message is opened and its contents are analysed. Invalid requests are discarded and an error is delivered. For valid requests however, the appropriate query is constructed and sent to the database System. The database system uses this query to find the appropriate information. The results are sent to the mobile system which then sends it as text to the client.



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2.2.1 Flow of Communication into the System

The flow of communication is the dynamic modelling of the AINRS. The operations performed by or to each entity class are:

- A client makes a call to the dedicated line and sends his student number
- The call is established by the telephone system.
- The student number is then sent to the intelligence unit. With this the appropriate intelligence is constructed and passed to the database System for validation.
- The database System connects to the student's database and validates the student number.
- Upon validation a reply as to whether the client is valid or not is returned to the intelligence.
- The intelligence passes this information (once again structured) to the speech manager. When the client is valid, the instructions are read out to him otherwise he is rejected as an invalid client and the call ended.
- When the instructions are read the user is required to make a selection either by voice or DTMF tones.
- Each selection is then forwarded to the intelligence.
- Upon analysis by the intelligence part, the client's request is structured and sent through the database System to the appropriate the database class handler.
- The reply to the request retrieved is forwarded to the intelligence part which structures it and sends the information in a properly structured way.
- Upon validation that the client has received his/her information the telephone system waits for a short interval before terminating the call.

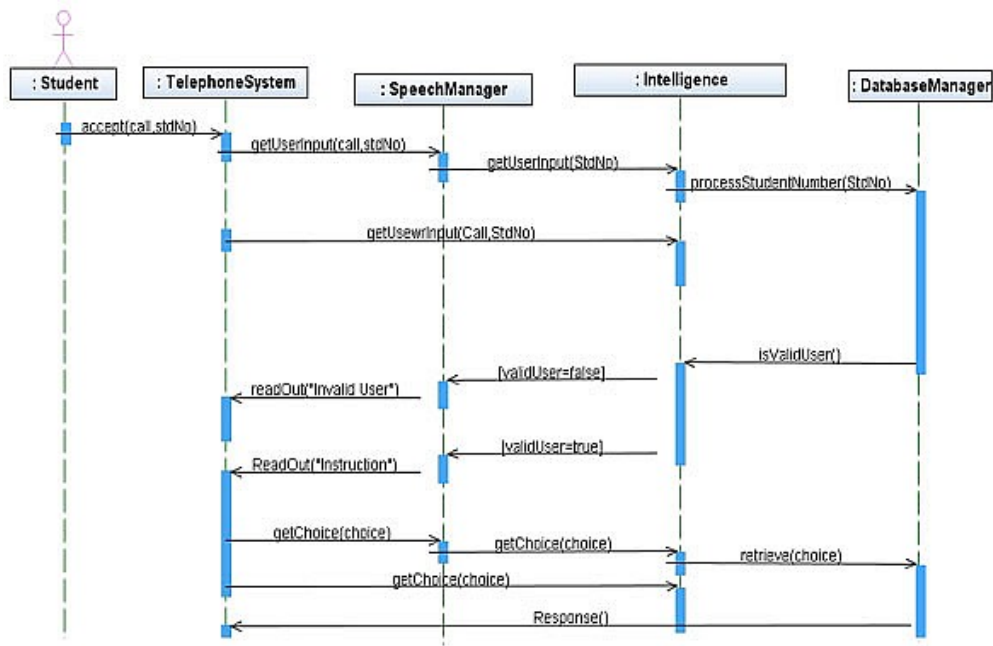


Figure 2: Sequence Diagram (Zoom: 150%)

In this system application the client (student) has many choices he/she can make depending on the information he/she requires. These include

- Retrieval of CWA results
- Retrieval of trailed courses for a previous semester
- Retrieval of semesters time table
- Retrieval of examination time table
- Retrieval of general information such as date for the reopening of the next semester and other general information.

2.3 Functional Modeling of AINRS

This section presents the functional modeling of AINRS. The present scenarios (an instance of a use case) of all the use cases are in Figure 3. The figure show the various use cases for this application. An instance of a use case will be any of the following:

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- Receive exams time table
- Receive trail courses
- Request trail courses
- Request general information
- Receive general information
- Request CWA
- Request course outline
- Receive course outline
- Receive time table

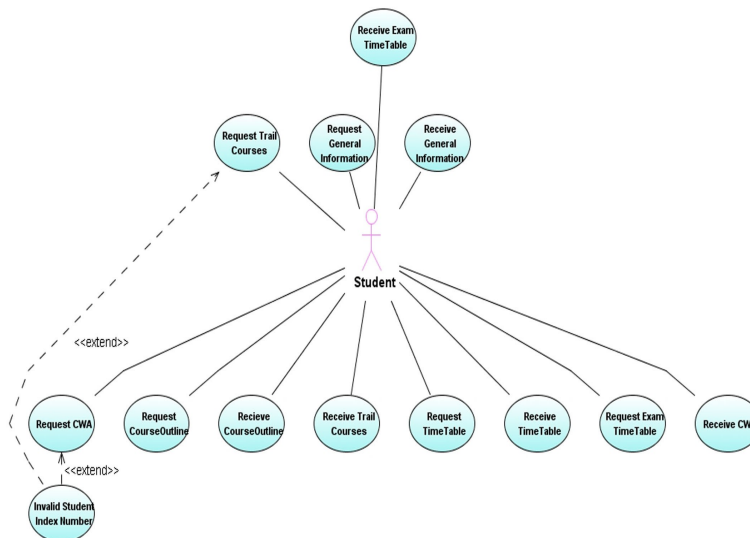


Figure 3: Use cases

3 CONCLUSION

Here, the conclusion takes into account the treatise of software analysis concepts with the briefing on entity, functional and dynamic models. I show that taking AINRS into consideration a hypothetical ICC system can be built by analyzing a requirement specification on similar modular approach. First, the ICC system needs to decide on the entity models to be implemented in a database, second the dynamic models of the system will need to be thought through and lastly, the functional model of the system usages have to laid out. These three

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models can cause the heart of the system to start beating properly in terms of data communication.

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