

Software Design & Architecture

Engr. Abdul-Rahman Mahmood

DPM, MCP, QMR(ISO9001:2000)

 armahmood786@yahoo.com


 alphapeeler.sf.net/pubkeys/pkey.htm

 pk.linkedin.com/in/armahmood

 www.twitter.com/alphapeeler

 www.facebook.com/alphapeeler

 abdulmahmood-sss  alphasecure

 armahmood786@hotmail.com

 <http://alphapeeler.sf.net/me>

 alphasecure@gmail.com

 <http://alphapeeler.sourceforge.net>

 <http://alphapeeler.tumblr.com>

 armahmood786@jabber.org

 alphapeeler@aim.com

 mahmood_cubix  48660186

 alphapeeler@icloud.com

 <http://alphapeeler.sf.net/acms/>

About The Course

Course portal

http://alphapeeler.sourceforge.net/me/?page_id=622

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ABOUT ME

ARTICLES

CONSULTANCY

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EVENTS

RESEARCH

http://alphapeeler.sf.net/me

Achievements

Certifications

Linkedin profile

My Projects

Responsibilities at UIT

Skill Summary

Teaching

Technical Skills

FAST-SDA

This page is for the FAST – NU Students of registered in the course of Software Design 2021 session.

Facebook group:

<https://fb.com/groups/FASTSDASp21/>
Email: fastsdasp21@groups.facebook.com

Internship & job announcement:

If you need a job or internship, please upload your resume so that I can send you industry as soon as the vacancy arrives. please upload your CVs here:
URL: <http://alphapeeler.com/CV/login.php>
Students can see the guidelines on how to upload CV here:
[CV Portal Guidelines.pdf](#)
Note:
1. Students can only view or edit their own CVs. Only I can see all uploaded CVs of students from admin control.
2. Remember that I want to see you doing very high profile job. Because your early and successful placement in industry is actually my success! Best of Luck!

Text books:

1. [UML 2 Toolkit by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David](#)

Banking

Bloom's taxonomy

Class Management & Policies

Consulting hours

Courses Taught

faculty share – UIT

FAST

Online Courses

PAFKIET

Projects

UIT

CALENDAR

February 2021

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

FAST-DDR-Sp19

FAST-DDR-Sp20

FAST-DP-Fa17

FAST-MS-AP-Fa19

FAST-OOAD-Fa17

FAST-OOAD-Fa18

FAST-OOAD-Fa19

FAST-OOAD-Sp17

FAST-OOAD-Sum17

FAST-SDA-Fa20

FAST-SDA-Sp21

FAST-SE-Fa17

FAST-SE-Fa19

FAST-SE-Sp18

FAST-ST-Fa19

FAST-WD-Fa20

Class Policies

← → ↺ alphapeeler.sourceforge.net/me/?page_id=177 ☆

Class Management & Policies

Engr. Abdul Rahman is expecting each student to follow Classroom / Lab Policies, & Procedures listed below:

A. Note from Engr. Abdul Rahman: I have established a few simple policies to lead a respectful and disciplined classroom. You are responsible to comply with the policies. If you fail to comply, there will be serious consequences.

B. Class / Lab Rules:

1. **Strict attendance policy:** Students are required to maintain 100% attendance throughout the session. 5 Minutes margin will be given after that student will be marked absent.
2. **No space for plagiarism:** Incase, if any of the assignment/project deliverables found plagiarized, the whole assignment/ project will be marked 'ZERO'.
3. **Late submission:** Within 1 day after deadline => 25% marks will be deducted. After 1 day => 50% marks will be deducted. After 2 days, 'ZERO' credit will be given.
4. **Submission of Assignment:** Students will submit their assignments within due date. If a student has an excused absence from class he or she is responsible for the assignments / homework that missed. It is up to the student to inquire about missed work and tests. Zero will be given if a student fails to make up work within an acceptable period. Following elements are mandatory for an assignment file:
 1. Assignment must be submitted in a proper file cover, and must be labeled properly.
 2. On cover page following items should be printed: Student name, Roll no, Date of submission.
 3. Attach print of the assignment question paper issued by the instructor after cover page.
 4. Attach hand written assignment after question paper.
5. **Consultation Time:** Students are advised to meet Engr. Abdul Rahman during the consultation time of the course only with prior appointment. Refer to the procedure for consulting hours from this url: http://alphapeeler.sourceforge.net/me/?page_id=158
6. **Project Submission:** The course required a proper project which will be submitted in Week 13. In this project, a proper report of at least 40 pages will be submitted after which a viva will be conducted in front of Engr. Abdul Rahman / HoD.
7. **Hand-held devices:** It is generally not acceptable to use cell phones, pagers, iPod/MP3 players, computers, etc. during lectures, except with the permission of Engr. Abdul Rahman and for reasons directly related to class activity.
8. **Lab assignments:** Assignments are checked only within lab timings. Lab files will not be entertained after lab timings.
9. **Courtesy and respect to all:** Students will exhibit courtesy and respect toward all other students at all times. Hateful comments concerning race, gender, sexuality, political views, appearance, or of any other type will not be tolerated; this applies to serious as well as "joking" comments.
10. **Leave the Food at Home:** Students may not eat in the classroom. This includes gum and candy. Drinks are also not permitted.
11. **Make-Up Tests:** There is no official policy defined for make-up tests, if you are absent or have not appeared in test then zero marks will be given to you.
12. **Final Year Students:** Students who are engaged in FYP, are responsible to demonstrate their work at least twice a week in FYP lab, otherwise I may send unsatisfactory report to the FYP coordinator.
13. **Leave policy:** Application of leave is not entertained by the class teacher, it should be notified to the HoD, and CC to Director Academics / Examination & Manager Student affairs. Even if the leave is approved, your class teacher will not mark you present on the basis of sick leave or any other type of leave. If you fail to maintain 75% attendance, you may not be eligible to sit in exams.

Class Policies

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14. **Class compensation:** Engr. Abdul Rahman will notify the CR of the class in case of any class missed due to holidays or extra class required for students. It is the responsibility of class CR to schedule extra class by after reviewing the time table of class and teacher's time table and book the classroom from administration block.
15. **Late arrival application:** No application will be considered for late arrival after the class has been dismissed. Students need to submit their late arrival application on the same date during the class. Teacher has the right to dismiss the late arrival apology application in case of regular late arrivals.
16. **Entering the Classroom Procedure:** Enter the classroom quietly and in advance of class starting time. Class start time means that you are in your seat and working on your exercise. Class CR is responsible to turn on the multimedia projector before the class starts.
17. **Classroom Exit Procedure:** Wait for me to dismiss you.

C. Exam policies:

1. Read all questions carefully first and then ask for clarifications.
2. Question paper related queries will not be entertained after 30 minutes after start of paper.
3. Do not write anything on question paper unless until specifically asked for.
4. Fill the required information and return the question paper along with the answer script.
5. Write your name, and enrollment number, otherwise you may not remain eligible for exam.
6. Get your paper signed from invigilator against your enrollment number; else your paper will not be checked.
7. Only attempt questions assigned to your column, otherwise you may disqualify from exam.
8. In case of MCQs, only circle one choice, otherwise you may disqualify from exam.
9. Any kind of miss-conduct/miss-behavior/cheating will disqualify the candidate.
10. Warning will be issued only once, along with -1 score, after that you will lose your eligibility for exam.

D. If YOU CHOOSE to Break a Rule: Punishments will always fit the crime. Of course there are behaviors that will warrant a Vice Principal's Referral immediately. Examples of this include gross insubordination or violent behavior.

Behaviors that are less severe, but in violation of the basic rules of the class will be dealt with in the manner described below. This format is in no way all inclusive and is subject to change:

1st Incident — Teacher/Student Conference

2nd Incident — Teacher/Student Conference, Parent Notification by phone or email, review behavior grade per grading policy.

3rd Incident — Referral to Administration / discipline committee.

Note: All students are required to print a copy of this page and submit to the class teacher with their signatures in order to make sure that all rules are communicated to the students.

Reference books

- UML 2.0 in Action by Patrick Graessle
- Systems Analysis and Design with UML 3rd Edition by Alan Dennis
- *UML Distilled, 3rd Edition by Martin Flower*
- Visual Modeling with Rational Rose by Terry Quatranie
- Unified Software Development by Booch, Rumbaugh, Jacobson

Assessment

- **Final Exam (50%)**
- **Home work assignments (10%)**
- **Term exams 30%**
- **Project(confirmed) 10%**

Course Goals

- After successful completion of this course students should be able to do analysis of software system. Do modeling using UML and create diagram like use cases, activity, class, sequence, collaboration etc.

Introduction to Systems Analysis and Design

What is Systems Analysis and Design?

- Systems are created to : solve problems.
- Think of the systems approach
an organized way of dealing with a problem.
- System Analysis and Design, mainly deals with
the software development activities.

Defining A System

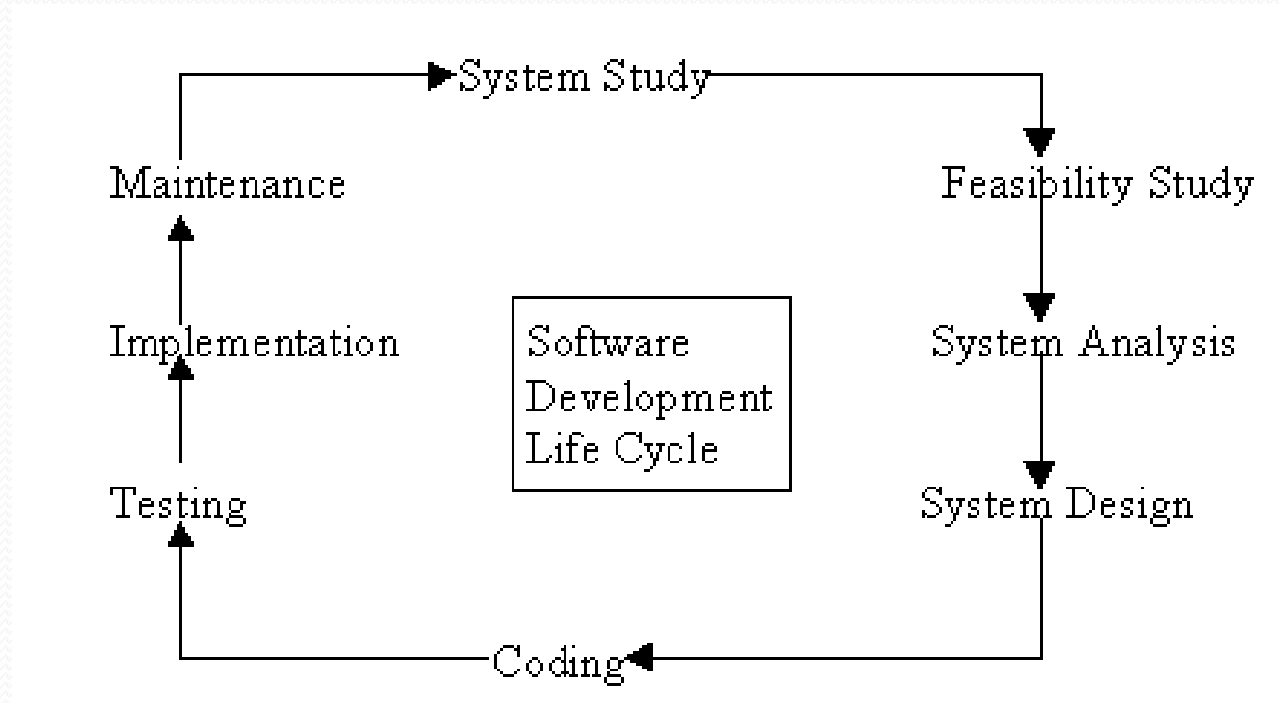
- A collection of components that work together to realize some objective forms a system.
- Basically there are three major components in every system, namely input, processing and output.



System Development Life Cycle

- System Development Life Cycle is an organizational process of developing and maintaining systems.
- System development life cycle means combination of various activities.
- Following are the different phases of software development cycle:
 - System study
 - Feasibility study
 - System analysis
 - System design
 - Coding
 - Testing
 - Implementation
 - Maintenance

System Development Life Cycle



System Environments ?

- Development
- Test
- Staging
- Pre-Production
- Production
- Mirror
- Roles involved:
 - D, DM, PM, TM, CM & DT.

System Study

- System study - 1st stage of system development life cycle.
- Gives clear picture of what actually the physical system is.
- **System study phases (I & II):**
 - I: initial survey of the system - helps in identifying the scope.
 - II: in-depth study - requirement identification / limitations & issues of current system.
- **Proposal:**
 - Prepared after completing the system study,
 - prepared by the System Analyst.
 - Contains the findings of the current system
 - Recommendations to overcome the limitations / issues of the current system.
- **Steps of System study phase:**
 - problem identification and project initiation.
 - background analysis.
 - inference or findings.

Feasibility Study

- Done on the basis of *initial study*.
- It is the test of the proposed system in the light of its workability, user's requirements, effective use of resources and the cost effectiveness.
- **Goal** : to achieve the scope.(not to solve issues)
- **Advantage**: Cost and benefits are estimated with greater accuracy.

System Analysis

- Analysis is detailed study of :
 - current system, leading to specifications of a new system.
 - system operations & its relationships within & outside system.
- **Data collection for:** files, decision points, & transactions of present system.
- **Tools of system analysis:** Interviews, on-site observation & questionnaire.
- **Steps to define boundary** of the new system:
 - Keeping in view the problems and new requirements
 - Workout pros & cons including new system
- **Analysis is documented in:** detailed DFDs, data dictionary, logical data structures & miniature specifications.
- Includes sub-dividing of complex process, data store identification & manual processes.

System Analysis Action items

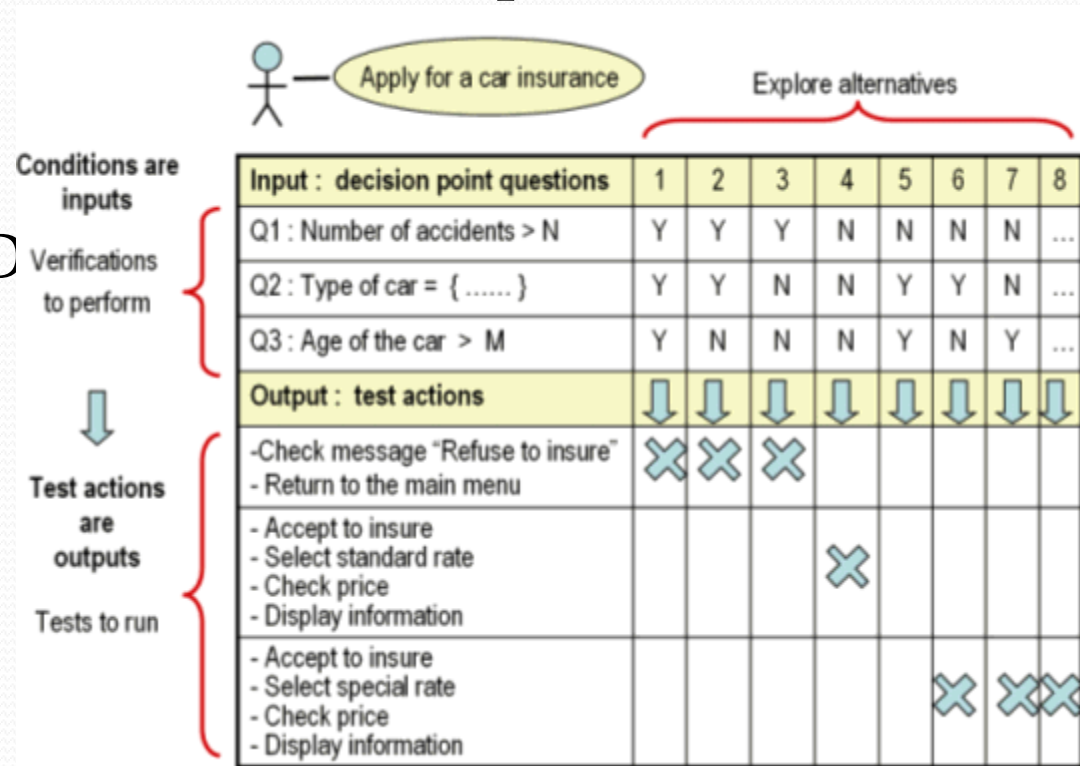
- **Specification** of what the new system is to accomplish based on the user requirements.
- **Functional hierarchy** showing the functions to be performed by the new system and their relationship with each other.
- **Function network** which are similar to function hierarchy but they highlight the those functions which are common to more than one procedure.
- **List of attributes** of the entities - these are the data items which need to be held about each entity (record)

System / Software Design

- Based on the user requirements and the detailed analysis of a new system, the new system must be designed.
- This is the phase of **system designing**. It is a most crucial phase in the development of a system.
- Normally, the design proceeds in two stages :
 - Preliminary or general design
 - Structure or Detailed design

- There are several tools and techniques used for designing. These tools and techniques are:

- Flowcharts
- Data flow diagrams (DFD)
- Data dictionary
- Structured English
- Decision trees



Coding

- **Coding** the new system into computer programming language converts human instructions into a format that computer understands.
- Coding is **stage** where defined procedure are transformed into control specifications by the help of a computer language.
- This is also called the **programming phase** in which the programmer converts the program specifications into computer instructions, which we refer as **programs**.
- The programs coordinate the data movements and control the entire process in a system.
- It is generally felt that the programs must be modular in nature. This helps in fast development, maintenance and future change, if required.

Testing

- Removing all the bugs, if any - **Before implementing**
- Test plan is developed and run on given set of test data.
- Output of test run should **match** expected results.
- Using test data following test runs are carried out:
 - **Unit test**: After coding / compiling programs, they are **individually** tested with test data. Any ambiguity must be noted & debugged.
 - **System Test**: done after unit test. Complete system is executed on actual data. Results or output of system is analyzed. If output is not matched with expected outputs, errors are identified and are fixed.

Implementation

- After UAT, the implementation phase begins.
- It is the stage during which theory is turned into practice.
- All programs of the system are loaded onto the user's computer.
- After loading the system, training of the users starts. Main topics of such type of training are:
 - How to execute the package
 - How to enter the data
 - How to process the data (processing details)
 - How to take out the reports
- After the users are trained about the computerized system, manual working has to shift from manual to computerized working.

System Run Strategies:

- **Parallel run:** computerized & manual systems are executed in parallel. Advantages of Parallel run:
 - Manual results comparison with the computerized one.
 - Failure of the computerized system at the early stage, does not affect the working of the organization.
- **Pilot run:** New system is installed in parts. Some part of the new system is installed first and executed successfully for considerable time period. Advantages:
 - When results are found satisfactory then only other parts are implemented.
 - This strategy builds the confidence and the errors are traced easily.

Maintenance

- **Maintenance is required to:**
 - eliminate errors in the system during its working life
 - tune the system to any variations in its working environment.
- Errors are always in system that must be corrected.
- **System Review:** is necessary from time to time for:
 - knowing the full capabilities of the system
 - knowing the required changes or the additional requirements
 - studying the performance
- **Major change** during the review:
 - If a major change to a system is needed, a new project may have to be set up to carry out the change.
 - New project will then proceed through all above life cycle phases.

Systems Development Methodologies

- Object-Oriented analysis and design
 - Object-Oriented analysis and design becoming popular because of its ability to thoroughly represent complex relationships, as well as represent data and data processing with a consistent notation
 - Object-Oriented analysis and design blend analysis and design in evolutionary process
 - It allows you to deal with the complexity inherent in a real-world problem by focusing on the essential and interesting features of an application

Systems Development Methodologies

- Object-Oriented analysis and design
 - Process of progressively developing representation of a system component (or object) through the phases of analysis, design and implementation
 - The model is abstract in the early stages
 - As the model evolves, it becomes more and more detailed

Systems Development Methodologies

- Object-Oriented analysis and design
 - Object-Oriented systems development life cycle
 - The Object-Oriented development life cycle consists of progressively developing an object representation through three phases analysis, design, and implementation
 - Analysis Phase
 - Object-oriented analysis is a popular approach that sees a system from the viewpoint of the objects themselves as they function and interact
 - Model of the real-world application is developed showing its important properties
 - Model specifies the functional behavior of the system independent of implementation details

Systems Development Methodologies

- Object-Oriented analysis and design
 - Design Phase
 - Analysis model is refined and adapted to the environment
 - Can be separated into two stages
 - System design
 - Concerned with overall system architecture
 - Object design
 - Implementation details are added to system design
 - Implementation Phase
 - Design is implemented using a programming language or database management system