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Software Development Life Cycle

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Overview

- What is SDLC and how it relates to software development
- Business Analysis
- Requirements Analysis
- Design
- Implementation
- Testing
- Deployment
- Maintenance
- Hands-On Exercise

What is SDLC

Software Development Life Cycle (SDLC) is a process used by the software industry to design, develop and test high quality softwares. The SDLC aims to produce a high-quality software that meets or exceeds customer expectations, reaches completion within times and cost estimates

Software Development Life Cycle - Phases

SDLC Example: First Family Home

In order to get a clearer understanding of the Software Development Life Cycle, we will look at what it takes to build that first family home.

There is great planning involved.

Stage 1A – Business Analysis

The **Business Analysis** phase (initial part of the **Requirements Analysis** phase) answers the question – **Where are we now?**

We need to understand current business processes and practices, which would help us in determining the business needs. Also, to produce a product that is, not only, of good quality, but fit for use.

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What is the current situation?

- One bedroom apartment (we now have 2 kids)
- Limited closet space
- High rent (more than a mortgage)
- Small kitchen (would like more space)
- One bathroom servicing 4 people
- No parking space
- No privacy
- No place for kids to play
- Too many people in neighborhood

Stage 1B – Requirements Analysis

The **Requirement Gathering** phase (also known as **Requirements Analysis**, when including Business Analysis phase) answers the question – **What are we building?**

This is the phase where Business Analysis gather information from the customer that describes what they want and how they want it used.

This is the MOST important stage of the SDLC. Every other phase is based on the requirements.

What are we looking for?

This is definitely not the time to think about food. We need to have a clear understanding of:

- What we want to have? (desire to have – initial plans)
- What we have to have? (absolutely necessary)
- What is just gravy? (extra stuff – not expected enhancements)

We need to have a picture in mind.

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Let’s evaluate our picture

Now that we have a picture in mind of what we want, let’s get the architect involved. Ooops, we forgot about how much it will cost. This house is way above our budget. Let’s “trim the fat” and looks for something simpler.

Now we have a clear picture

We have gone through our list of requirements. We know exactly what we want, what we need and what we can have as “gravy”.

We now have a clear picture of our new home. Let’s call the architect in to see what he can do.

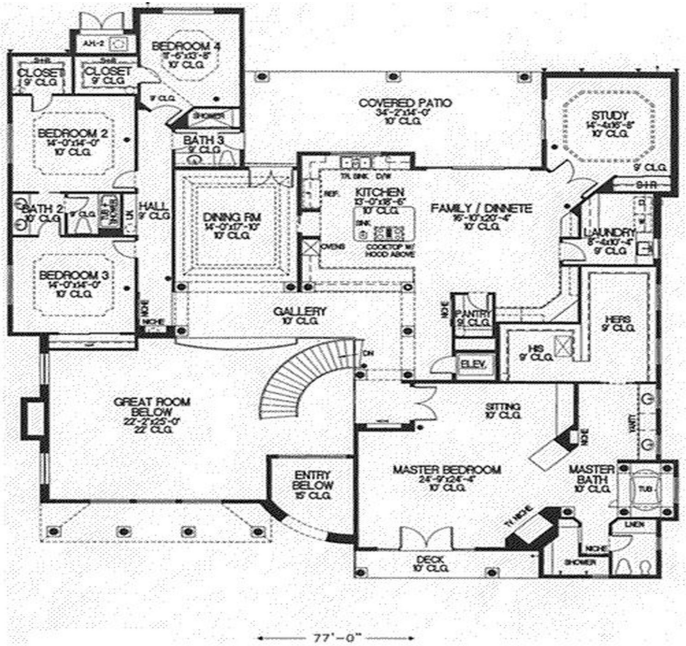
Stage II - Design

The **Design** phase answers the question – **How do we build it?**

This phase is key to the developer. The design is pieced together from the system analysis. There are various graphical designs used to illustrate the flow of the application. From a system perspective (security, notifications, business requirements, etc.), to a user perspective (menu's, files, editing, calculation, etc.), all flows have to be clear, so coders can complete their work.

Architectural Design

We only had to make minor adjustments, but the plans look great. Now it's time to build.



Stage III - Implementation

The **Development** phase (here, referred to as the **Implementation** phase) is where the action is – **Let's make it happen?**

Now that we have a clear understanding of how the application is supposed to work, it is time for our team of programming experts to begin coding.

Programming tools like compilers, interpreters and language like C, C++, and Java etc., are used for coding .with respect to the type of application. The right programming language should be chosen.

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Let's BUILD!!!! YAAAAY!!

During construction we discovered a few design challenges, but the work is proceeding nicely.

Our lead contractor is on the case, making sure everything is the way we want it. He is also conferring with the inspectors to make sure the building codes are being met.

Stage IV – Testing

The **Testing** phase answers the question – **Is the software of good quality?**

Software Quality is best determined by how well the software meets the requirements. How there is another perspective to look at, and that is the user perspective; those that will be using the software on daily basis.

This is referred to **"Fit-for-use".** Here we test the application using organized "Manual" and/or "Automated" testing.

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Until finally Home Sweet Home!!!

The kids are getting excited. The husband is already making friends with the new neighbors and packing boxes. But WAIT!! We need to have the inspection done.

Let's cross our fingers.

Stage V – Deployment

Now that the application has been built, and it has passed testing, so that it is determined to be of the highest quality, it is time to deploy. This is the purpose of the **Deployment** stage.

This stage is also referred to the **Implementation** or **"Go Live"** stage. It is now time to see if our business analyst and programmers have earned the big bucks, the company has paid for their services.

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Time to move!!!

The inspection went through like a charm and it's time to move.
The kids are packed, and the truck is on the way.

It's time to move into our dream home.
Everyone is happy.

Stage VI – Maintenance

The **Maintenance** phase is an ongoing process. There is no such thing as a completed application. There is always room for improvement, or something overlook. **Maintenance** phase refers any Upgrades, fixes or improvements to the application, after **Implementation**.

Home Improvements and Repair

A home is never completed. There are always repairs to be made. And because families change, whether kids grow up and go away to college or new kids are born, the home changes. And we are always thinking of ways to make our home more valuable by making additions.

Mowing the Lawn

Adding some Kitchen Tiles

Shelving for Garage

Painting Kid's Room

Summary Review

- The SDLC is a methodology process used to deliver quality software.
  - Requirements Analysis – What do we want?
  - Design – How we want?
  - Implementation – Let's make it happen.
  - Testing – Quality, did we do it right?
  - Deployment – Time to "Go Live"
  - Maintenance – Let's make it better.

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Questions?

Test Your Knowledge

1. Enhancements, upgrades, and bug fixes are done during the _____ step in the SDLC?
   A. Problem Identification
   B. Design
   C. Development
   D. Maintenance
2. The difference between High Level Design (HLD) and Low-Level Design (LLD) is that HLD contains architectural diagrams of overall components, while LLD consists of thorough descriptions and details.
   A. True
   B. False
3. Determining user expectations happens during which phase of SDLC?
   A. Design
   B. Maintenance
   C. Requirements Analysis
   D. Testing

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Hand's On Exercise

Scope:
This exercise is to prepare students for interviewing a SME (Subject Matter Expert), in order to obtain information related to business requirements. This will be a group exercise and the following skills will be assessed:

Leadership qualities
Coverage of the application
Teamwork
Creativity in getting SME to give useful requirements
Identification of Functional and Non-Functional requirements

Setup:
STEP 1: The class will be broken up into groups of 5 students. One of the students will act as SME for a particular application. If necessary Instructor will act as SME for one of the groups, if numbers are not even. The groups will have choice of either Microsoft Word, Excel, and PowerPoint, but SME will have option to choose one of their own.

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Hand's On Exercise – Cont.

STEP 2: The group will come together to evaluate all of the requirements gathered, by the same group, and make sure that the requirements are clear. You need to make that the requirements provide coverage of the application presented. One person will be designated to coordinate this process (someone other than the SME for that group). There should be one list, which is a compilation of everyone's requirements' list in the same group.

STEP 3: The compilation lists will be dissimulated amongst all team members (including SME for the group) and each member will take list home and separate requirements into Functional and Non-Functional requirements. This completed list will then be uploaded into LMS for review.

Outcome:
A list from each student, listing the requirements broken down into Functional and Non-Functional requirements. List Header should contain the student's name, application the discussion was on, date, and who the SME was for the assignment. This list is to be published in LMS.

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Hand's On Exercise – Notes

- Exercise will be located in LMS under Assignments
- Exercise will not be graded, however, there will be notes made to original documents
- Depending on how exercise goes, there may be more than one meeting with SME to get clarity for the requirements
- For SME's please use an application that you are well verse in. We do not want to be too creative here. It will make it difficult, when trying to go to next phase of the SDLC process.
- Understand this is only a sample of what it takes to get requirements analysis. As course is limited on time, the idea is to understand the concept, and not to perfect the process.

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End of Module