COMP3004 Notes

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Contents

1 Introduction

1.1 Development Life Cycle

1.1.1 Requirements Analysis

- requirements
  - ➢ functional
  - ➢ non-functional
- functional model
- dynamic model
- analysis object model

1.1.2 High Level System Design

- subsystem decomposition
- system architecture strategies

1.1.3 Detailed Object Design

- detailed object model
  - ➢ class diagrams
- design patterns and contracts

1.1.4 Implementation

- map associations to
  - ➢ collections (easy)
  - ➢ storage (hard)

1.1.5 Testing

- unit testing
- integration testing
- system testing

1.2 Team Work

- we can't each do a part and put it together
- we have to do it all together

1.3 Tools

- VirtualBox
- VM
  - ➢ Qt Framework comes with it
  - ➢ Dia comes with it
- C++

1.4 Textbook

- textbook is a good indication of how much detail you need for deliverables
  - ➢ follow the arena case study
  - ➢ perfect level of detail

2 Software Engineering Overview

2.1 Definitions

- software engineering
  - ➢ software
    - code
    - application
  - ➢ engineering
    - technical process for achieving a task
    - building something
  - ➢ what **is** software engineering
    - requirements analysis
    - building software
  - ➢ what is **not** software engineering
    - building tiny little program
- system
  - ➢ what is a system in software engineering?
    - a very **large** piece of software
    - so big, we don't call it
      - ▷ a program
      - ▷ an application
- we need a **reliable process**
  - ➢ a *recipe*
  - ➢ why?
  - ➢ wanted:
    - **reliable** systems
    - **modifiable** systems
      - ▷ we don't want to throw away code to add a new feature
  - ➢ we need a **plan**

2.1.1 The Plan

- two ingredients
  - ➢ technical
  - ➢ management

Technical Aspects

- **understand** the problem
  - ➢ *how do we do this?*
  - ➢ **ask the client**
- figure out an **optimal solution**

Management Aspects

- keep things **on track**
- plan for change
  - ➢ *anything can change at any time*

2.2 Technical Aspects

2.2.1 Application Domain

- **relevant to the problem**

- the *client's world*
- airport example
  - ➢ planes
  - ➢ runways
  - ➢ gates
  - ➢ passengers
  - ➢ luggage
- we are **not** experts here
  - ➢ the *client* is

2.2.2 Solution Domain

- the **fix** for the problem
- *our* world
- GUI
- design patterns

2.2.3 Building Models

- what is a model?
- why do we need a model?
- what can go wrong?
- types
  - ➢ functional
  - ➢ dynamic
  - ➢ object

The Point of Models

- look at a small scale version
  - ➢ don't necessarily build a small scale version
  - ➢ look at some different *views* of it
- figure out
  - ➢ *how will it work?*

Modeling the Application Domain

- requirements analysis
  - ➢ **describe** problem to be solved
  - ➢ **describe** system requirements
  - ➢ **identify** objects required

2.3 Management Aspects

- communication tools
- configuration management
- rationale management
- software development process

2.3.1 Dealing With Change

- the earlier the better

2.3.2 The Stakeholders

- client
  - ➢ users
  - ➢ interacts with
    - ■ project managers
    - ■ requirements team manager
      - ▷ QA
- development team
  - ➢ project manager
  - ➢ architect
  - ➢ analyst
  - ➢ designers
  - ➢ programmers
  - ➢ testers
  - ➢ operations

2.4 Software Development Phases and Products

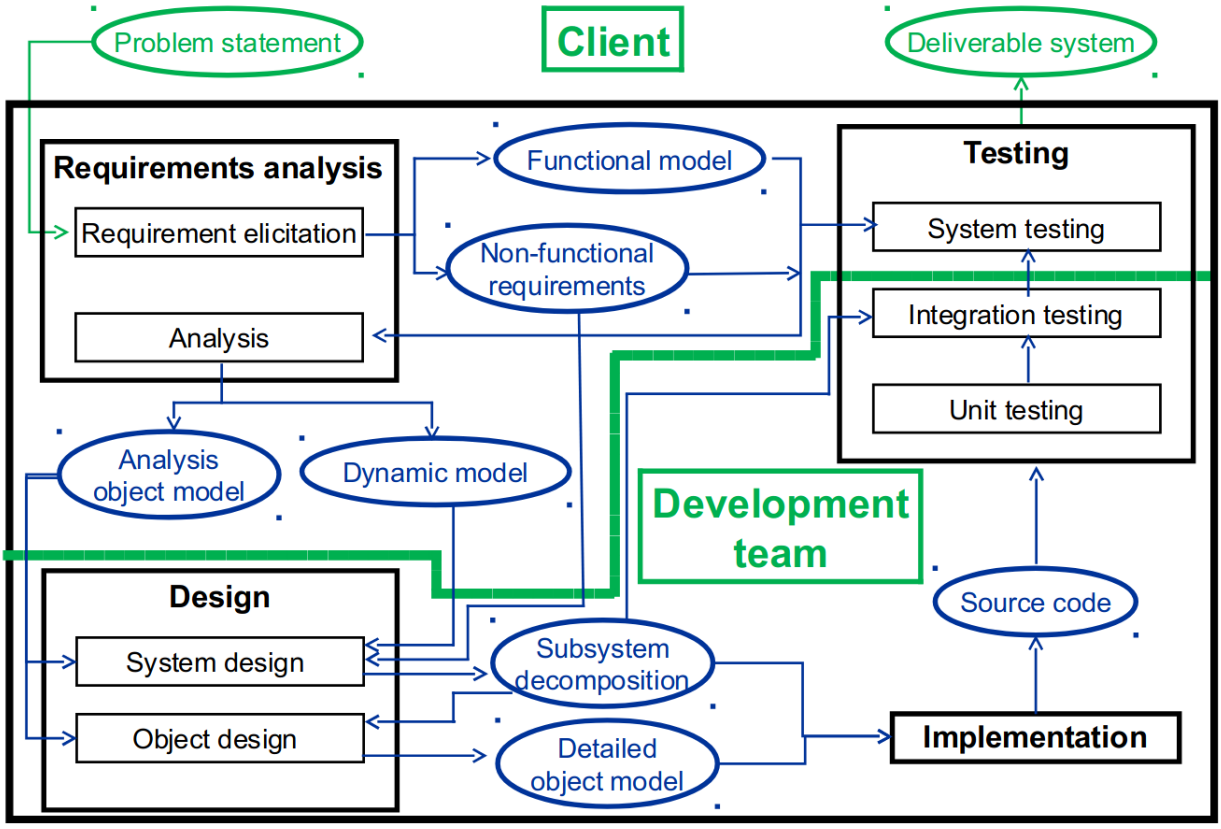

Figure 1: Phases of software development.

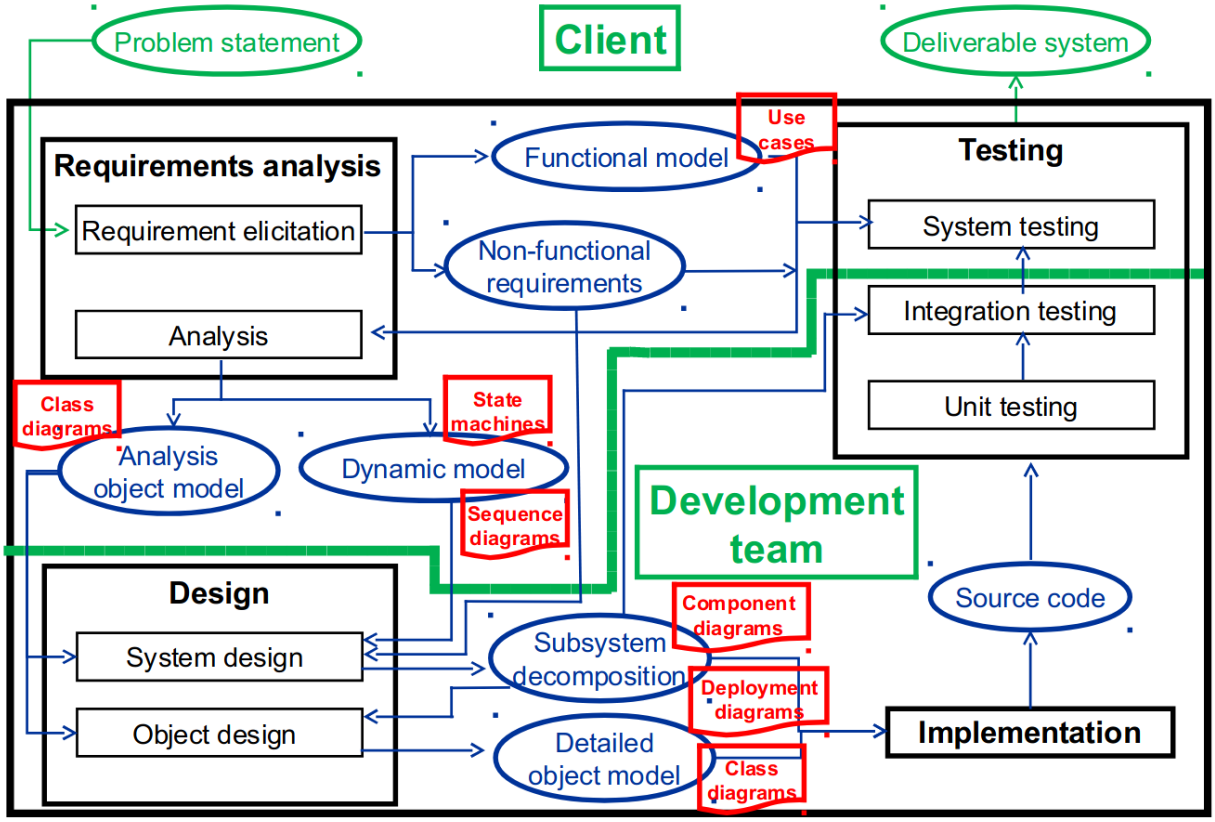

Figure 2: Phases with their products.

3 Team Organization

3.1 People Management

- we **all** manage people
  - ➢ what others expect of us
  - ➢ what we expect of others
- **communication**
  - ➢ speak up about issues
- everyone has bad days
  - ➢ your own
    - ■ don't be a diva
  - ➢ other people's
    - ■ humor and empathy
- **celebrate successes**

3.1.1 Four Factors in Managing People

- consistency
  - ➢ treat others equally
  - ➢ equally $\neq$ identically
- respect
  - ➢ appreciate different skills
- inclusion
  - ➢ listen to all ideas

- honesty
  - ➢ about work
  - ➢ about skills

3.1.2 Recipe for Success

- **team meetings** are **essential**
  - ➢ Discord
  - ➢ in person
- assign people roles that
  - ➢ they are **good at**
  - ➢ they **enjoy**
- leader works **for** the team
  - ➢ encourage
  - ➢ motivate
  - ➢ listen

3.2 Team Structure

- team leader
- primes (all four people have one or two of these)
  - ➢ documentation (ONE or TWO people)
    - documents have consistent formatting
  - ➢ requirements (ONE or TWO people)
    - ensure all requirements are documented and traceable
  - ➢ architecture/design (ONE or TWO people)
    - ensure design is complete **and optimal**
  - ➢ testing (TWO people, MUST pick ANOTHER ROLE)
    - ensure all features match requirements
  - ➢ configuration (ONE person ONLY, MUST pick ANOTHER ROLE)
    - ensure deliverable is packed correctly
- coding (all four people are assigned here
  - ➢ back end
  - ➢ front end

4 The Project

4.1 Deliverable 1

- requirements analysis document
  - ➢ Christine says she might scale this slightly back
- implementation of selected features
  - ➢ demo

4.2 Deliverable 2

- algorithm design document
  - ➢ and **slides** for presentation
  - ➢ we **cannot** modify the slides we submit
- in-class presentation
  - ➢ on the document/slides we submitted
- implementation of selected features
  - ➢ demo

4.3 Deliverable 3

- system design document
- implementation of selected features
  - ➢ demo

4.4 Deliverable 4

- document revisions
  - ➢ algorithm design document specifically, Christine thinks
- implementation of selected features
  - ➢ demo

4.5 Expectations

- **everyone** has to work, **no exceptions**
  - ➢ 25% each
- **follow** the **formats discussed in class**
- **end results matter**
  - ➢ **not** effort
  - ➢ **only** results
- submissions **must** be accompanied by **peer evaluations**
  - ➢ grades will be adjusted based on contribution

4.6 System

- Carleton University Animal Care System
  - ➢ cuACS