

# **LECTURE 2**

# **SYSTEMS**

# **DEVELOPMENT LIFE**

# **CYCLE (SDLC) &**

# **PLANNING PHASE**

**LEK HSIANG HUI**

# LEARNING OBJECTIVES

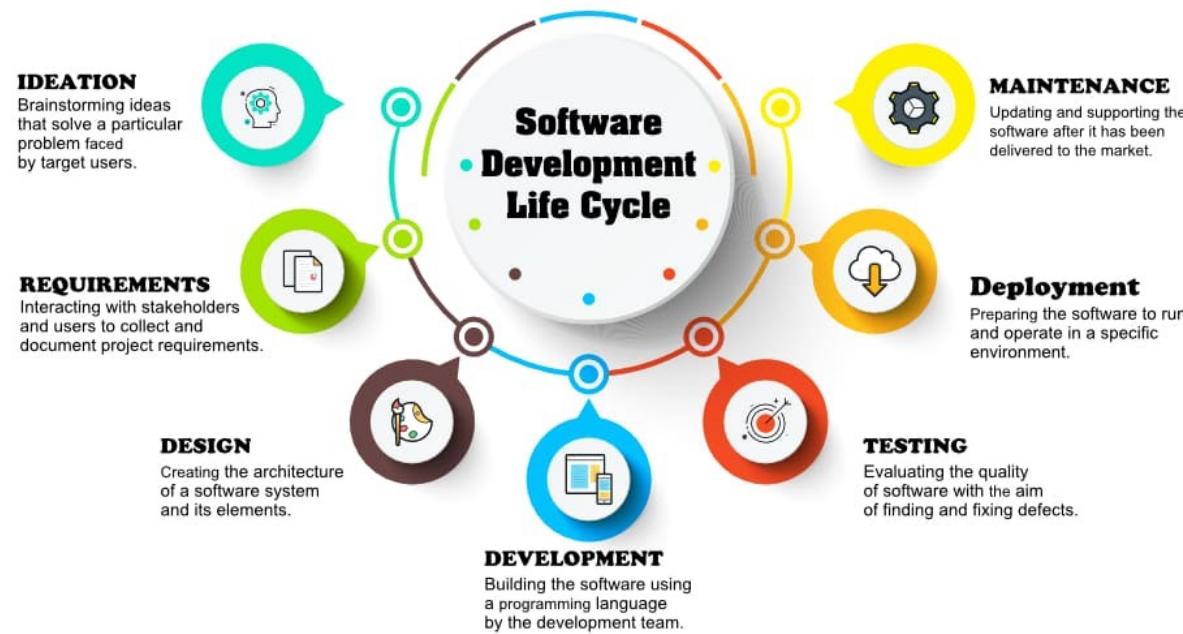
**At the end of this lecture, you should understand:**

- What predictive SDLC and adaptive SDLC are
- The activities during the planning phase
- What Business Requirement Document (BRD) is
- How to draw activity diagrams

# SYSTEMS DEVELOPMENT LIFE CYCLE (SDLC)

Sometimes also known as Software Development Life Cycle (SDLC)

A structured and systematic process for developing system



# QUESTION TIME



*“It’s about coming out with the software right? Why bother talking about this? Shouldn’t we just go straight into coding? Shouldn’t we be \*agile\*?”*

**1. What do you think?**

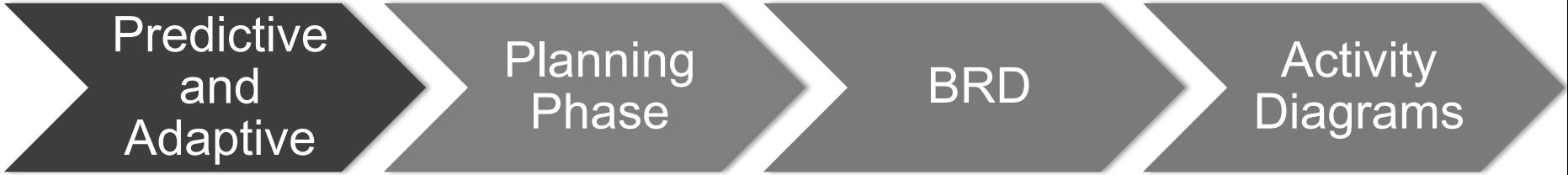
# SYSTEMS DEVELOPMENT LIFE CYCLE



Can be generalized  
into 2 different  
approaches:

1. Predictive SDLC
2. Adaptive SDLC

# PREDICTIVE AND ADAPTIVE SDLC



Predictive  
and  
Adaptive

Planning  
Phase

BRD

Activity  
Diagrams

# PREDICTIVE AND ADAPTIVE SDLC

THE APPROPRIATE SDLC VARIES DEPENDING ON THE PROJECT

PREDICTIVE  
SDLC

REQUIREMENTS WELL  
UNDERSTOOD AND WELL DEFINED.  
LOW TECHNICAL RISK.

ADAPTIVE  
SDLC

REQUIREMENTS AND NEEDS  
UNCERTAIN.  
HIGH TECHNICAL RISK.

# SDLC IN PRACTICE

More traditional

New approaches evolved (together with object-oriented approaches)

Predictive  
SDLC

Adaptive  
SDLC

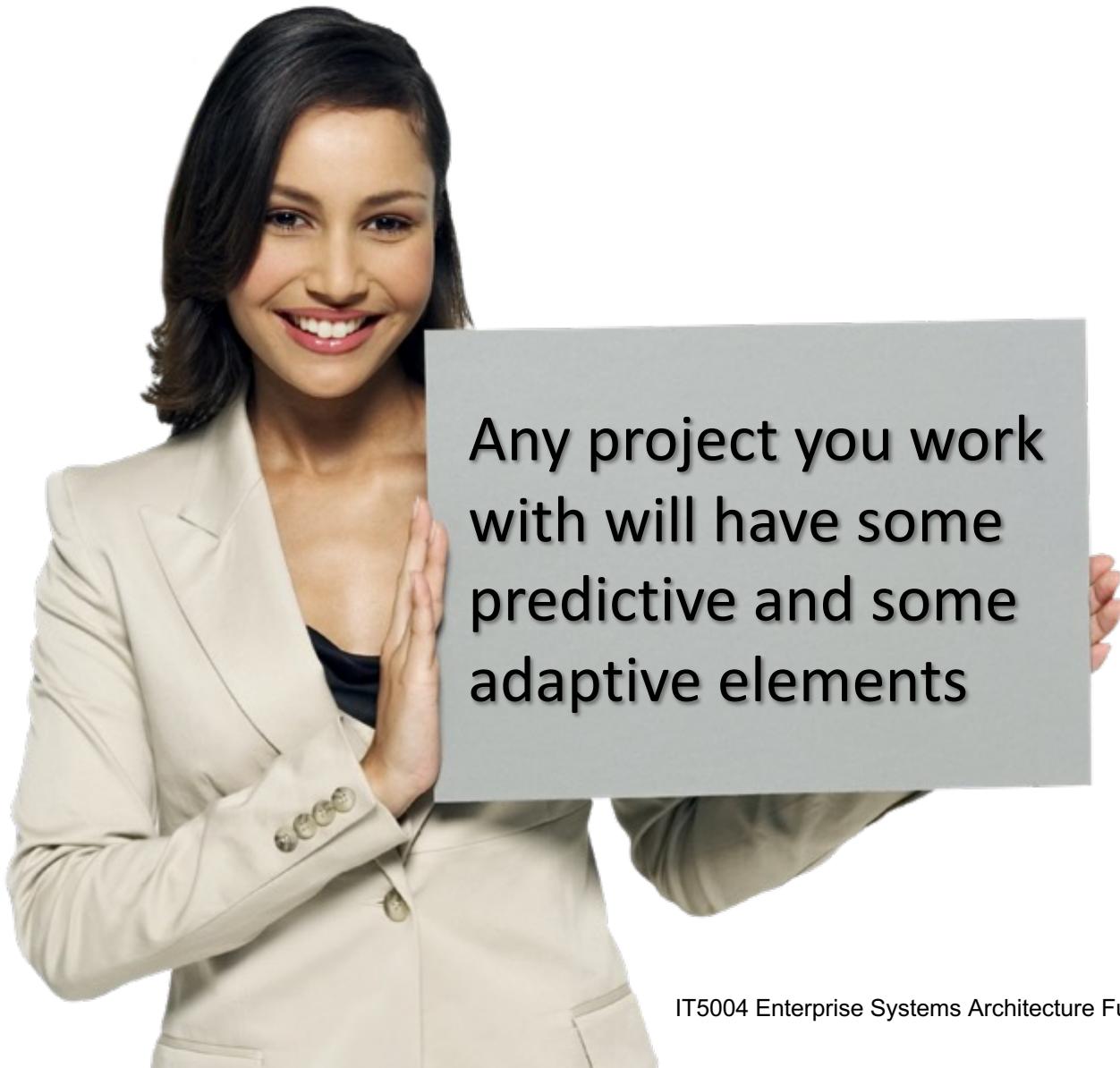
1970s

1980s

1990s

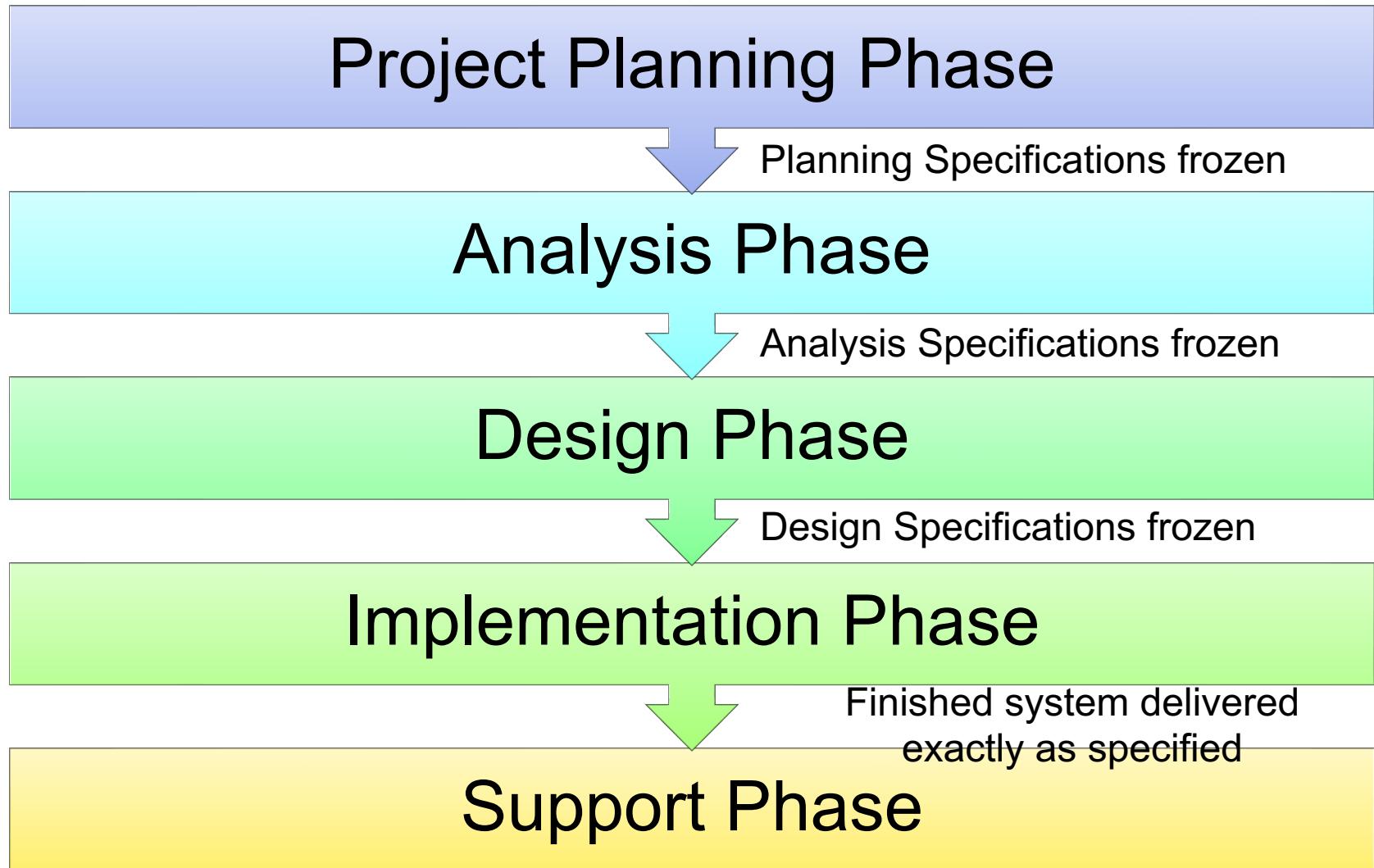
21<sup>st</sup> Century

# SDLC IN PRACTICE



# **PREDICTIVE (TRADITIONAL) SDLC**

# PREDICTIVE SDLC APPROACH



# QUESTION TIME



**Predictive SDLC is also commonly known as the **waterflow methodology****

**Why do you think it is called **waterflow methodology**?**

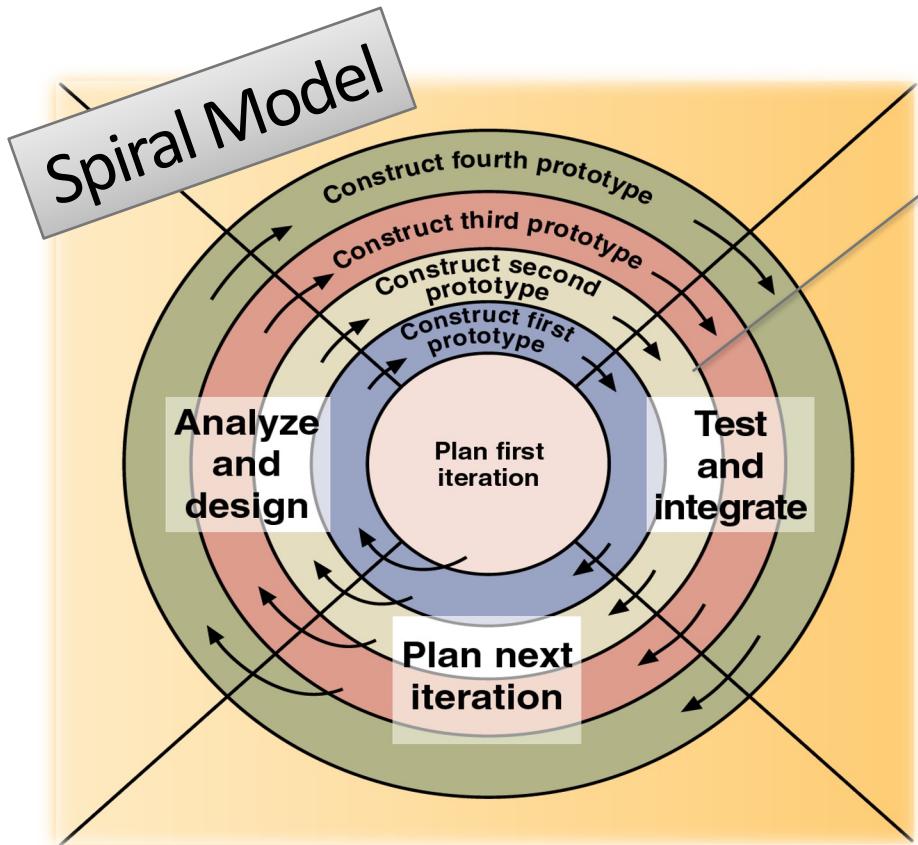


# **ADAPTIVE SDLC**

# **ADAPTIVE SDLC APPROACH**



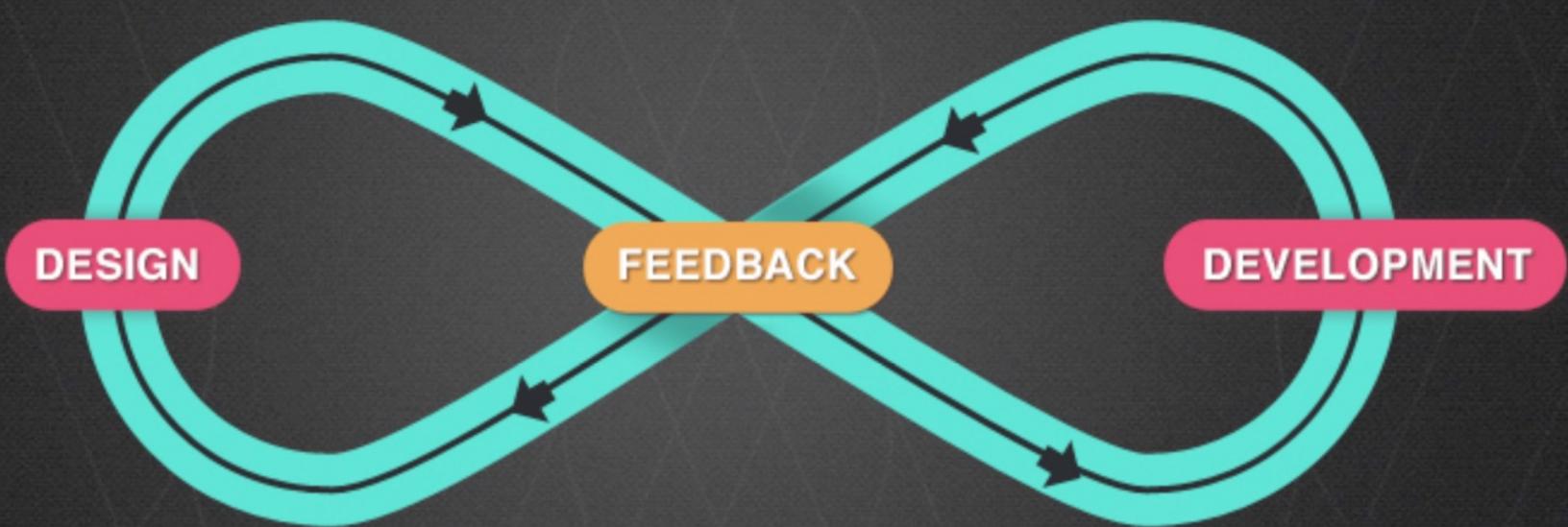
# IDEA OF ADAPTIVE SDLC



Contains many activities

- Start from the center and work its way outwards
- Working over and over .... (until the project is finished)
- Iterative approach

# ADAPTIVE SDLC

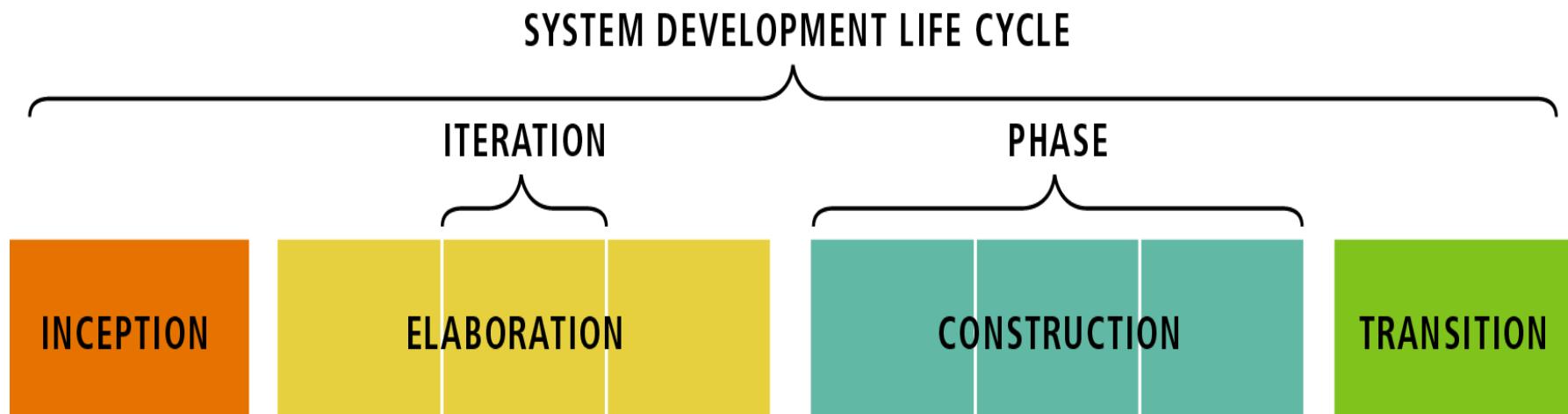


# **THE UNIFIED PROCESS LIFE CYCLE**

## **AN EXAMPLE OF ADAPTIVE SDLC**

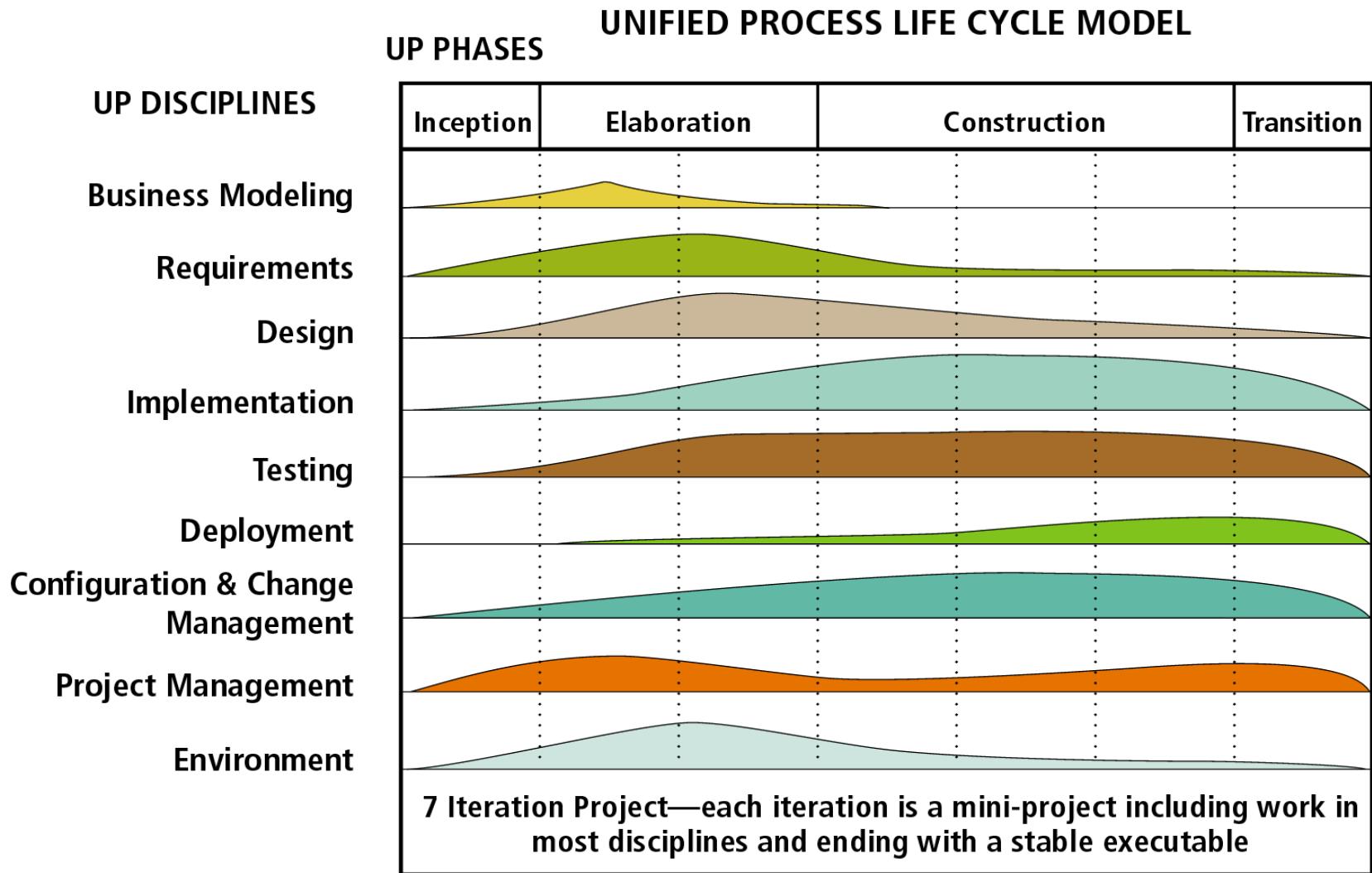
# THE UNIFIED PROCESS LIFE CYCLE

**Four phases: Inception, Elaboration, Construction, and Transition**



PHASES ARE NOT ANALYSIS, DESIGN, AND IMPLEMENT;  
INSTEAD, EACH ITERATION INVOLVES A COMPLETE  
CYCLE OF REQUIREMENTS, DESIGN, IMPLEMENTATION, AND TEST DISCIPLINES

# UP PHASES AND OBJECTIVES



# **PLANNING PHASE**



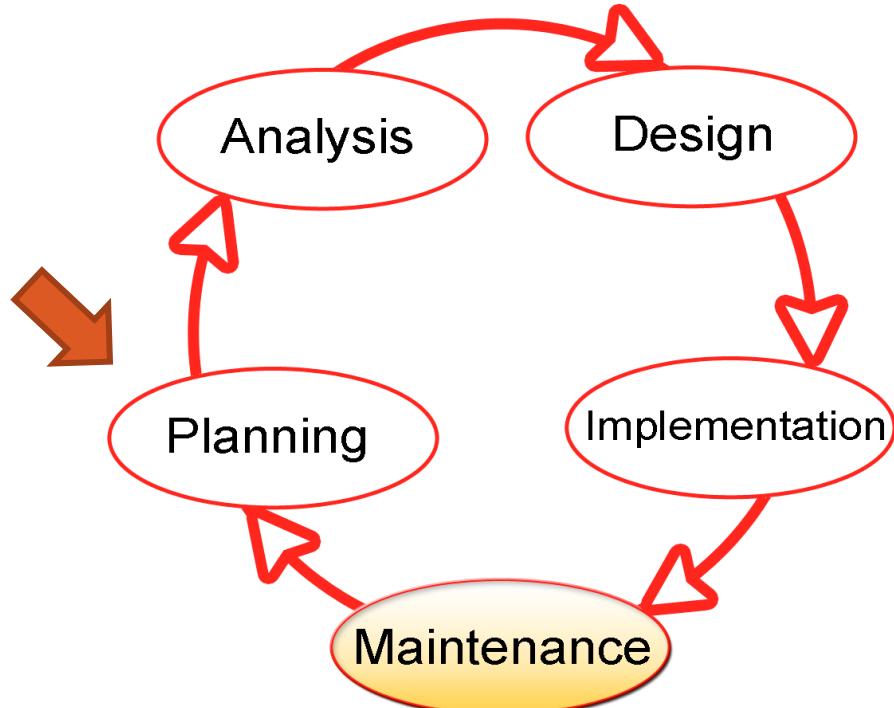
Predictive  
and  
Adaptive

Planning  
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# PLANNING PHASE



SDLC starts  
with  
Planning

Involve first  
understanding  
the business

# UNDERSTANDING THE BUSINESS

Need to understand the business environment and potential improvements

By talking to end users, manager, etc

# UNDERSTANDING THE BUSINESS

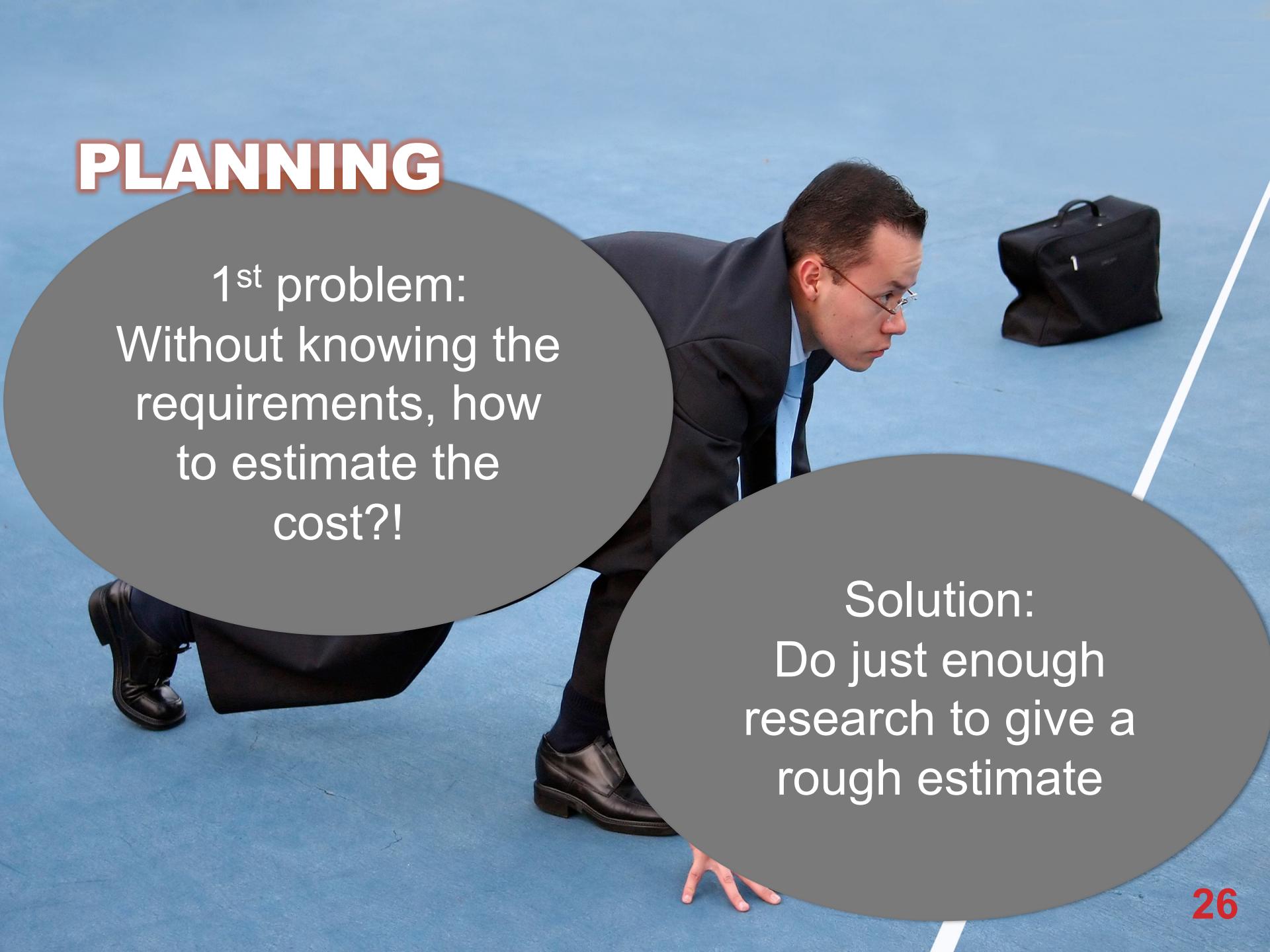
Would need to  
document the  
business vision, the  
business model,  
business problems,  
etc

# PLANNING

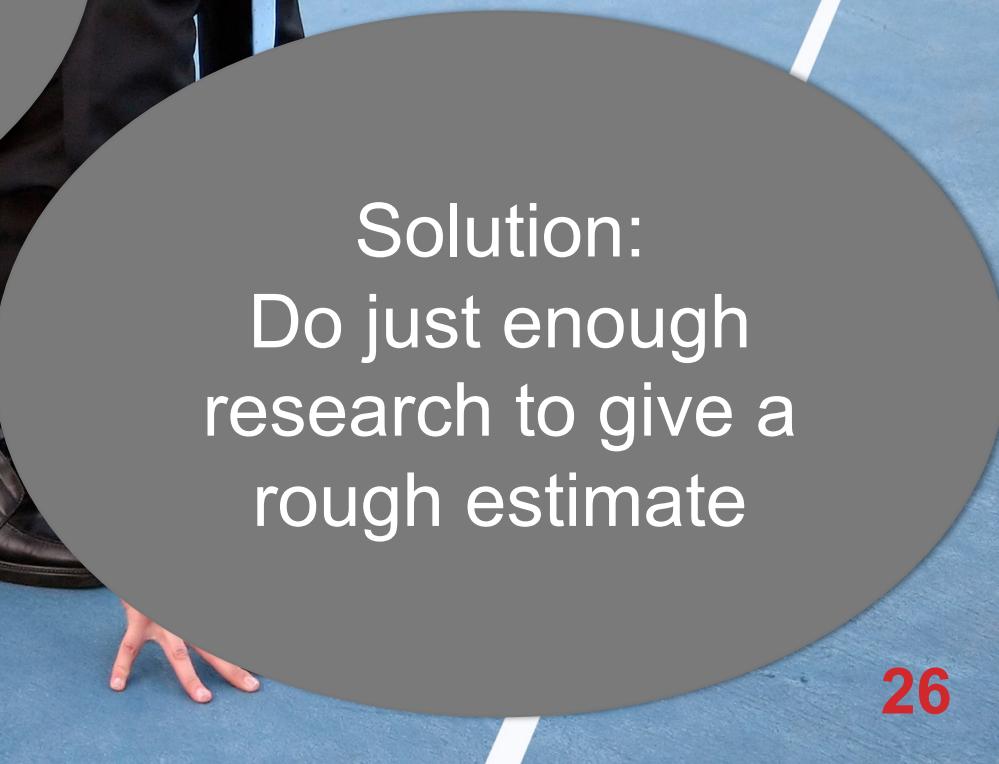
## Objectives:

- Develop the business case of the project
- Establish project/product scope
- Explore solutions (Preliminary)

# PLANNING

A man in a dark suit, white shirt, and tie is crouching on a blue running track. He is wearing glasses and has his hands on the ground in a starting position. In the background, there is a black bag on the track. A large grey oval shape covers the left side of the image, containing the text.

1<sup>st</sup> problem:  
Without knowing the  
requirements, how  
to estimate the  
cost?!



Solution:  
Do just enough  
research to give a  
rough estimate

# PLANNING



Identify and analyze  
business  
requirements

Everything is  
documented into a  
document for  
reference

# **BUSINESS REQUIREMENTS DOCUMENT (BRD)**



Predictive  
and  
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# **DELIVERABLES**

**A single document: Business Requirements Document (BRD)**

**Describe business requirements**

**The BRD will be revised as the project progresses**

**Key components of the BRD produced during the planning phase include:**

- **Business background**
- **Business problems**
- **Organization structure**
- **Project objectives**
- ...

# **DELIVERABLES**

**Key components of the BRD produced during the planning phase include:**

- ...
- **Feasibility analysis**
- **Resource planning (manpower, timeline, etc)**
- **Team configuration**
- **Business processes**

**Business processes can be analyzed using modeling techniques (UML)**

# BUSINESS REQUIREMENT DOCUMENT (BRD)

Acts as a contract between the business and the developer

So, it's important that all the requirements are documented completely and correctly

If a requirement is not found in the BRD → it's not part of the contract

# RECALL: UML



## Unified Modeling Language (UML)

- Standard set of model constructs
- Designed for Object-Oriented Development

# ACTIVITY DIAGRAMS

Predictive  
and  
Adaptive

Planning  
Phase

BRD

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Diagrams

# **ACTIVITY DIAGRAMS**

**Activity diagrams is a modeling technique for documenting the workflow in a graphical manner**

- It can be used to model various activities in SDLC
- During the planning phase, it can be used for modeling the business processes

**UML defines a set of notations for activity diagrams**

# ACTIVITY DIAGRAMS ELEMENTS

**Initial node:** indicates where the workflow begins

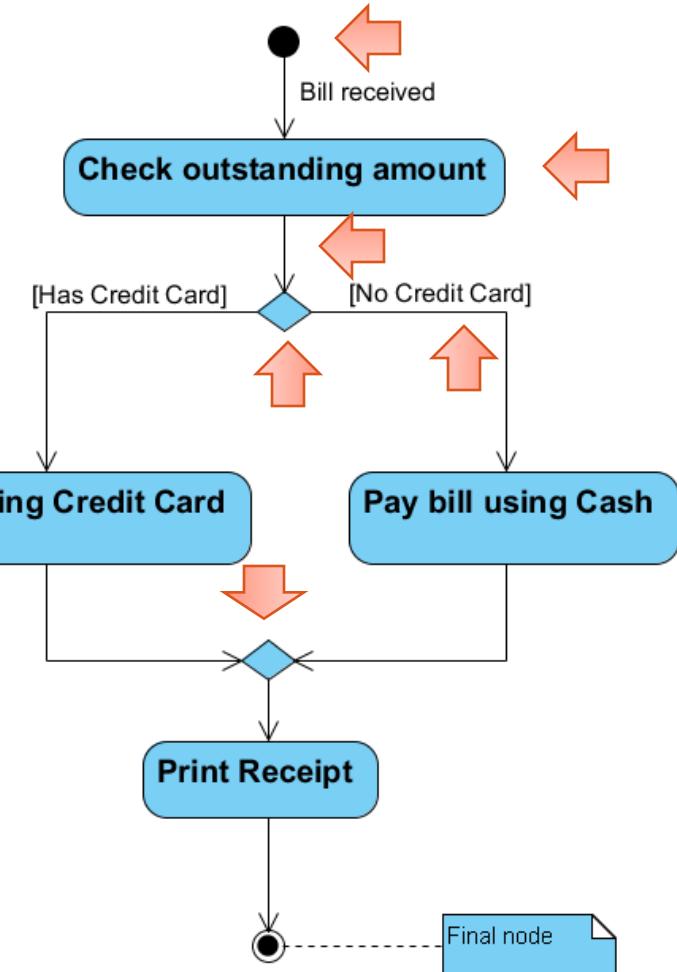
**Activity:** indicates a step in the process.  
Notice anything about the typical naming convention?

**Control flow:** an arrow showing the direction of the workflow

**Decision:** a diamond symbol, indicating a possibility of different paths

**Guard condition:** a condition attached to a control flow. A guard is shown within square brackets

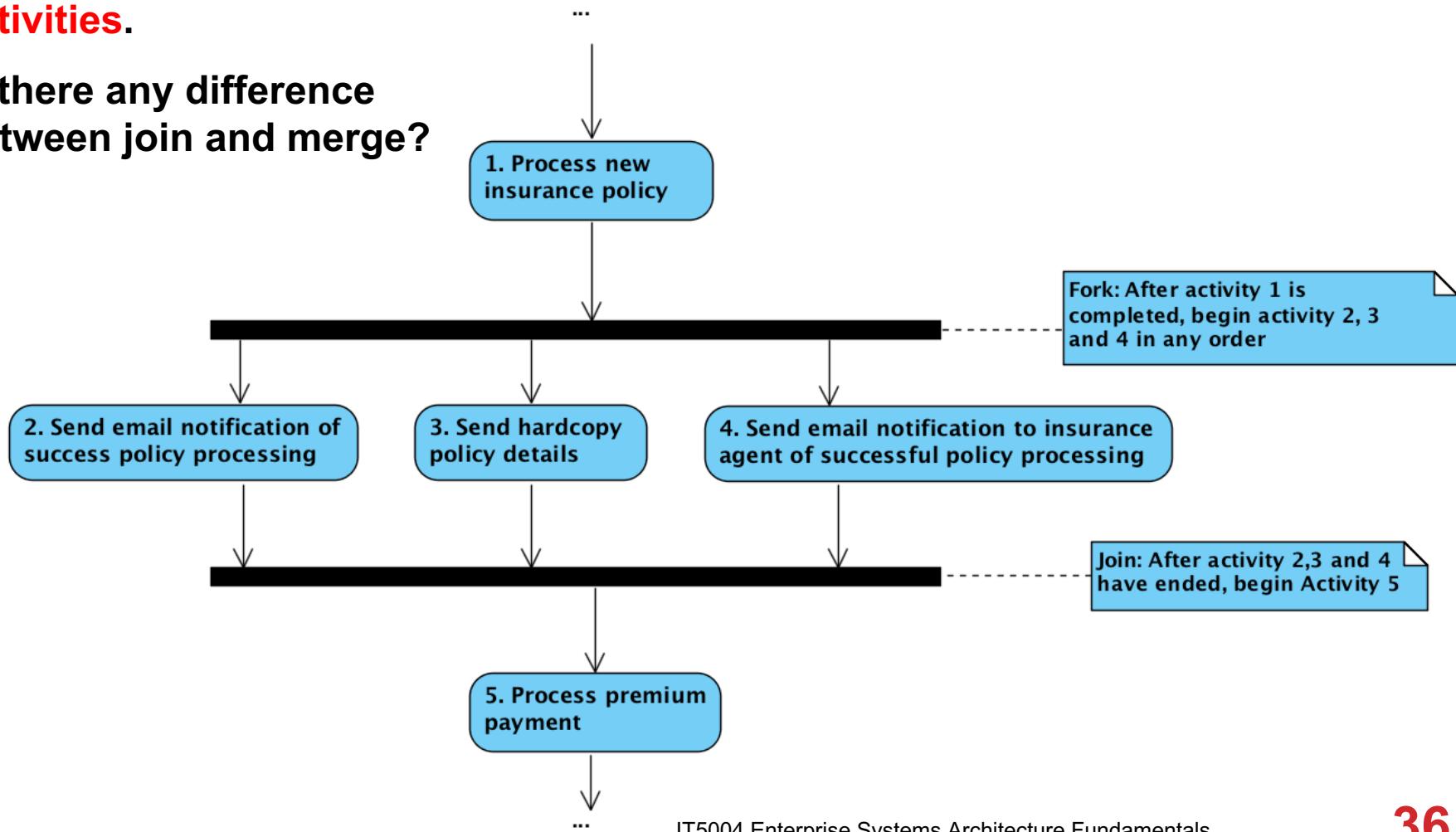
**Merge:** model a number of alternative flows that lead to the same activity



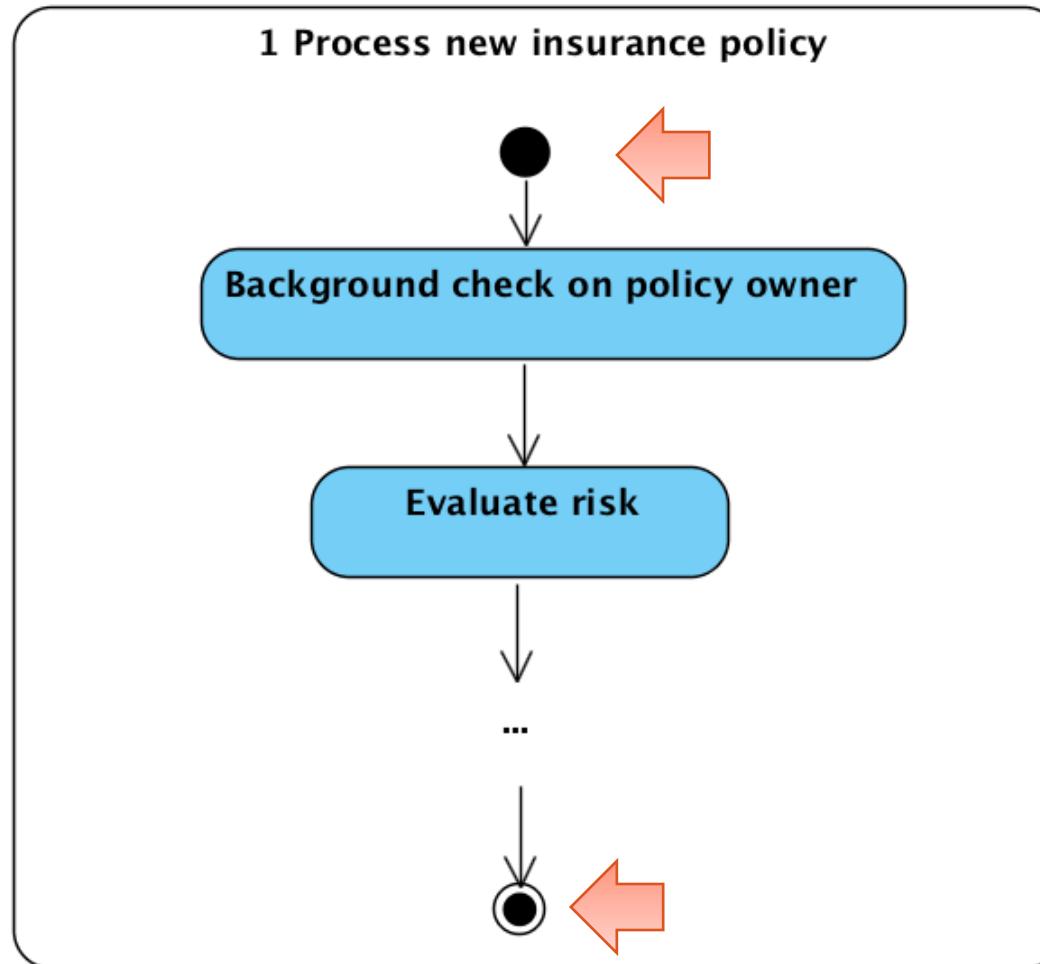
# ACTIVITY DIAGRAMS ELEMENTS

**Fork and Join:** bars used to document parallel activities.

Is there any difference between join and merge?

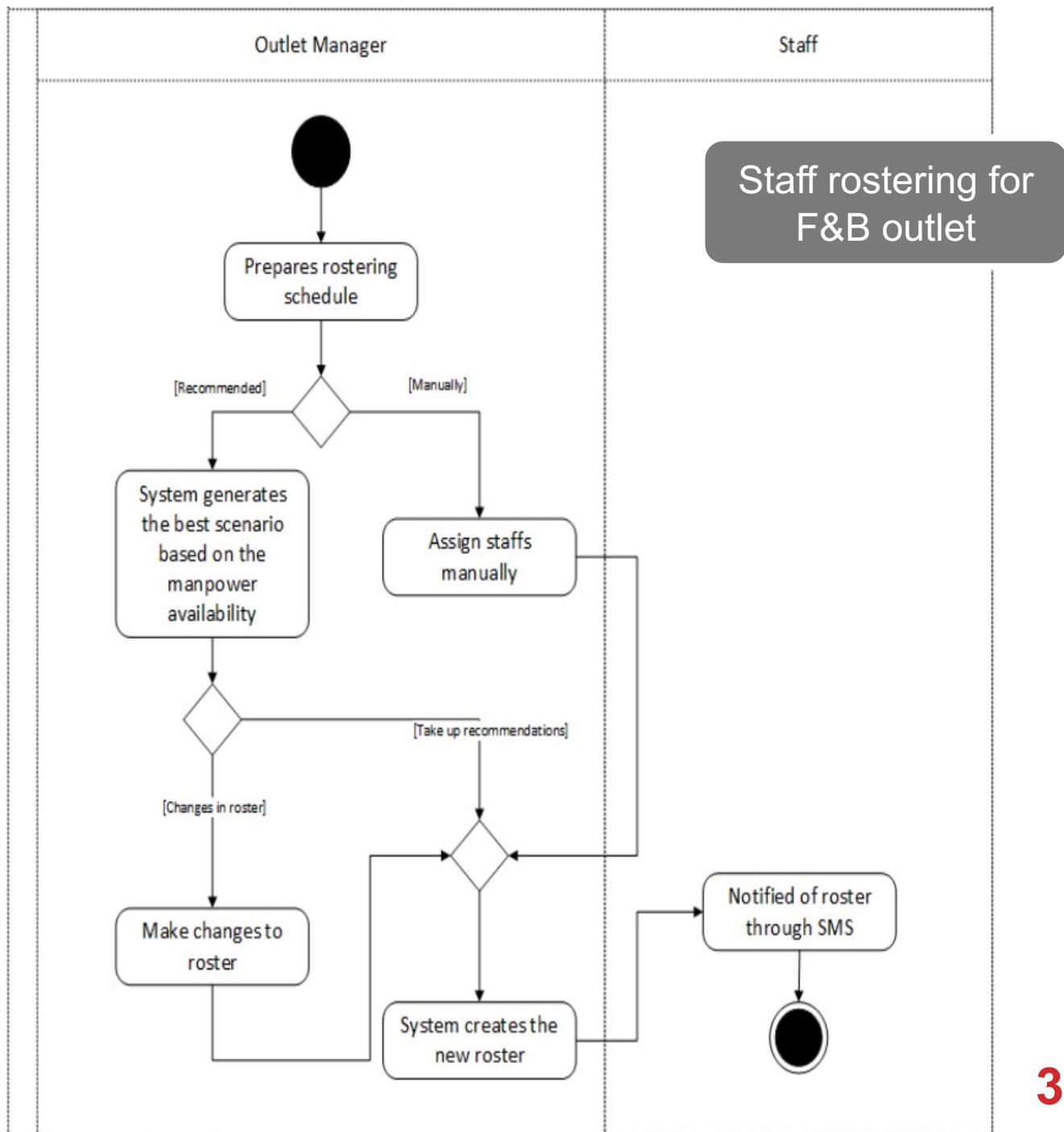


# NESTED ACTIVITIES

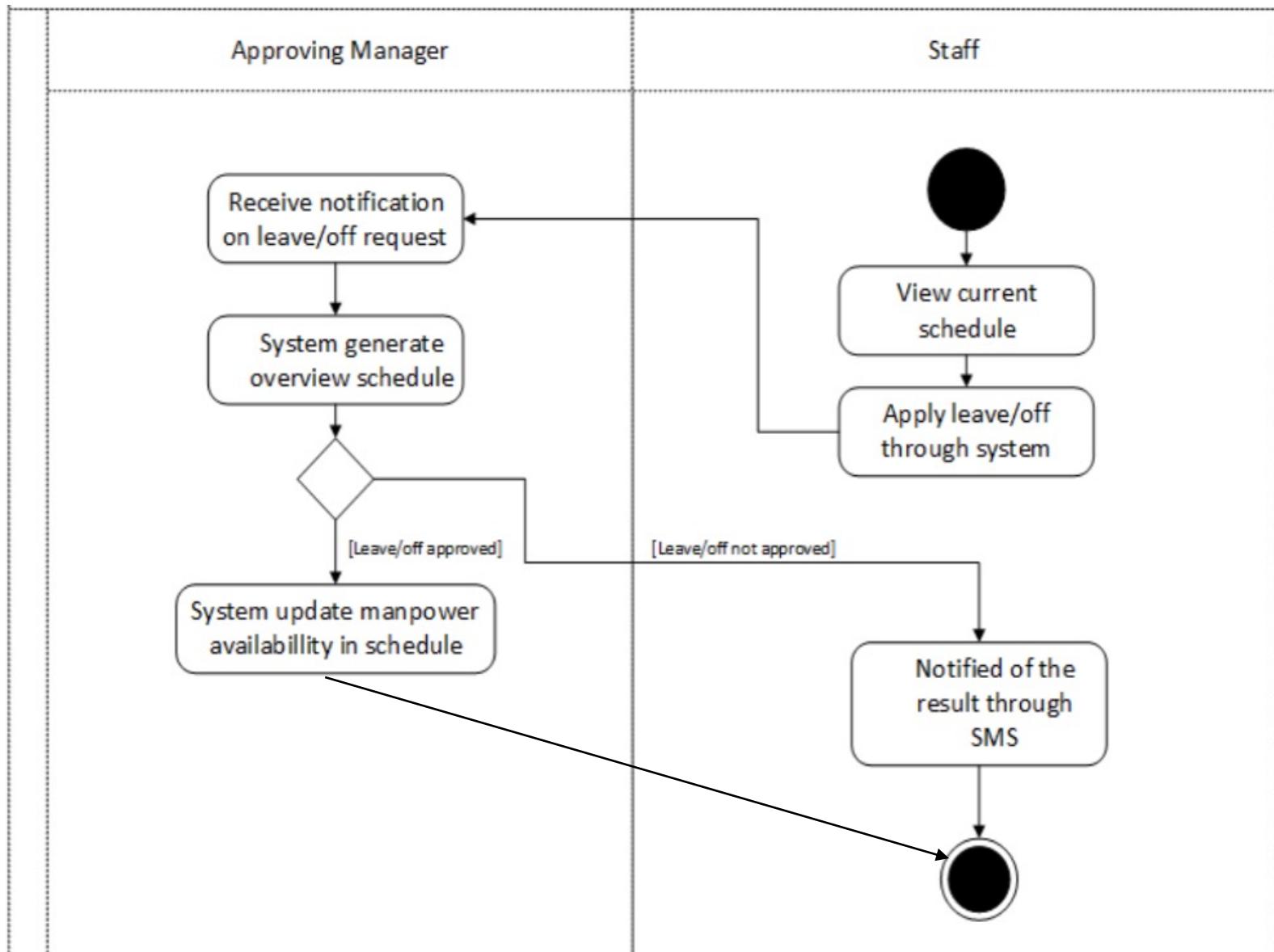


## Recommended approach

Use “swimlane” to partition the activities to different parties



## Process Leave application



# **UML DRAWING SOFTWARE**

## **Free UML drawing software available**

- Visual Paradigm Community Edition  
(<https://www.visual-paradigm.com/download/community.jsp>)
- Draw.io (<https://www.draw.io/>)

A close-up photograph of a man with dark hair and glasses, wearing a grey shirt. He is holding a plain white rectangular card in front of his chest with both hands. His fingers are visible at the edges of the card. The background is a soft-focus green.

It's your turn...

# **TASK**

**Draw an activity diagram (**swimlane approach**) that models how a customer would buy movie tickets off the counter**

**Think about (non-exhaustive):**

- What are the parties involved (swimlanes)?
- What information does the customer need to give?
- What are the step-by-step interactions
- Make sure that the notations are correct

# **TASK**

## **What are the equipment available?**

- Is there a tablet for users to choose the seats in front of the counter or does the staff need to make suggestions by looking at his/her screen?

## **Have you considered the payment options?**

- Cash, NETS, Credit Card
- For each case what needs to happen?

# **SUMMARY**

**Predictive SDLC vs Adaptive SDLC**

**Planning Phase Activities**

**Business Requirements Document**

**Modeling Business Processes using Activity Diagrams**

# **WHAT'S NEXT?**

## **Requirements Gathering**