Software Engineering

Project Management & Planning

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Acknowledgment

- Course slides are largely based on the slides prepared by the authors of the course main book
  - "*Software Engineering*" *tenth edition by Ian Sommerville*

- Other content and information are taken from other sources and explicitly referenced in their corresponding slides

- The slides and topics are carefully chosen and organised by the teacher of this course, Ahmed A.O. Tayeh, to meet the learning objectives of this course
  - Organisation of the topics do not match the reference book

Study Material

- Slides are the main study material

- Lecture discussions and notes should be considered

- Reference Book "*Software Engineering*" *tenth edition by Ian Sommerville*
  - course topics are not covered with the same order as the book
  - keep the book or its future editions as a reference for your software engineering career
  - anything that is not covered during the lectures, are not part of the exam

- Study material uploaded before each lecture at the study portal and the course repository GitHub account
  - https://github.com/atayeh-israa-university/SoftwareEngineering-2023

Software Project Management

- Activities involved in ensuring that software is delivered on time & schedule

- Needed because development is always subject to budget and schedule constraints

- Manage risks, people and planning

Software Project Success Criteria

- Deliver the software to the customer at the agreed time

- Keep overall costs within budget

- Deliver software that meets the customer's expectations

- Maintain a coherent and well-functioning development team

Factors Influencing Project Management

- Company size

- Software customers

- Software size

- Software type

- Organizational culture

- Software development processes

**These factors mean that project managers in different organizations may work in quite different ways.

Universal Management Activities

- Project planning
  - *PMs are responsible for planning, estimation & scheduling project development*

- *Risk management*
  - *PMs assess the risks that may affect a project, monitor these risks and take actions when problems arise*

- *People management*
  - *PMs must choose people for their team & establish ways of working that leads to effective team performance*

- *Reporting*
  - *PMs responsible for reporting on the progress of a project to customer and to their managers*

Risk Management

- Concerned with identifying risks and drawing up plans to minimise their effect on a project

- Is important because of the uncertainties in software development
  - loosely defined requirements
  - requirement changes
  - difficulties in estimating time and resources for software development

- Anticipate risks → understand their impact on the project
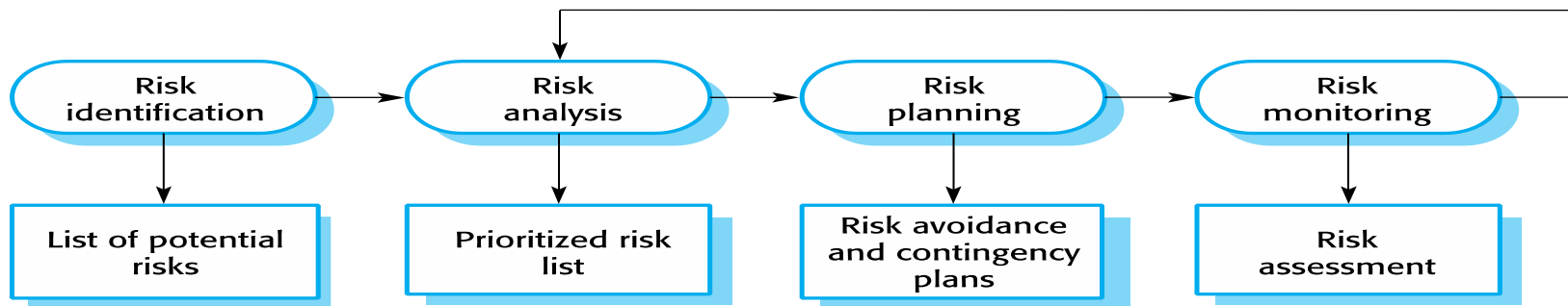 → take action steps to avoid (mitigate) these risks

Examples of Risks

Risk	Affects	Description
Staff turnover	Project	Experienced staff will leave the project before it is finished
Hardware unavailability	Project	Hardware essential for the project will not be delivered on time
Size underestimate	Project and product	The size of the system has been underestimated
Product competition	Business	A competitive product is marketed before the system is completed

Risk Management Process

- Risk identification
  - identify project, product and business risks (*3 types of risks*)
- Risk analysis
  - assess the likelihood and consequences of these risks
- Risk planning
  - draw up plans to avoid or minimise the effects of the risk
- Risk monitoring
  - monitor the risks throughout the project

| Risk identification | → | Risk analysis | → | Risk planning | → | Risk monitoring |

| List of potential risks | Prioritized risk list | Risk avoidance and contingency plans | Risk assessment |

Managing People

- People are an organisation's most important assets

- The tasks of a manager are essentially people-oriented
  - unless there is some understanding of people, management will be unsuccessful

- Poor people management is an important contributor to project failure

People Management Factors

- Consistency
    - team members should all be treated in a comparable way without favourites or discrimination

- Respect
    - different team members have different skills and these differences should be respected.

- Inclusion
    - involve all team members and make sure that people's views are considered

- Honesty
    - you should always be honest about what is going well and what is going badly in a project

Motivating People

- PM is responsible for motivating the people working on a project
  - organising the <u>work</u> and the <u>environment</u> to encourage people to work effectively
  - if people are not motivated, they will not be interested in the work they are doing (leaving the project!)

- Motivation is a complex issue
  - Basic needs (e.g., food, sleep, etc.)
  - Personal needs(e.g., respect, self-esteem)
  - Social need (e.g., to be accepted as part of a group)

Motivating People…

- PMs should consider different <u>types of personalities</u> while motivating their team members

  - task-oriented
    - the motivation for doing the work is the work itself

  - Self-oriented
    - the work is a means to an end which is the achievement of individual goals - e.g., to get rich, to play tennis, to travel etc.

  - Interaction-oriented
    - The principal motivation is the presence and actions of co-workers. People go to work because they like to go to work

Teamwork: Effectiveness of a Team

- Project team (group)
  - a mix of people with diverse activities such as negotiating with clients (BAs), programming, testing and documentation

- The group organization
  - group should be organized so that individuals can contribute to the best of their abilities and tasks can be completed as expected

- Technical and managerial communications
  - good communications between group members, and between the software engineering team and other project stakeholders, is essential

Teamwork: Group Communication

- Group size
  - the larger the group, the harder it is for people to communicate with other group members

- Group structure
  - communication is better in informally structured groups than in hierarchically structured groups.

- Group composition
  - communication is better when there are different personality types

- The physical work environment
  - Good workplace organisation can help encourage communications

Project Planning

- Involves breaking down the project stages/activities into parts and assign them to team members
  - anticipate problems that might arise and prepare tentative solutions to those problems

- Project plan is created at the start of a project
  - it is used to communicate how the work will be done to the project team and customers
  - it is used to assess progress on the project

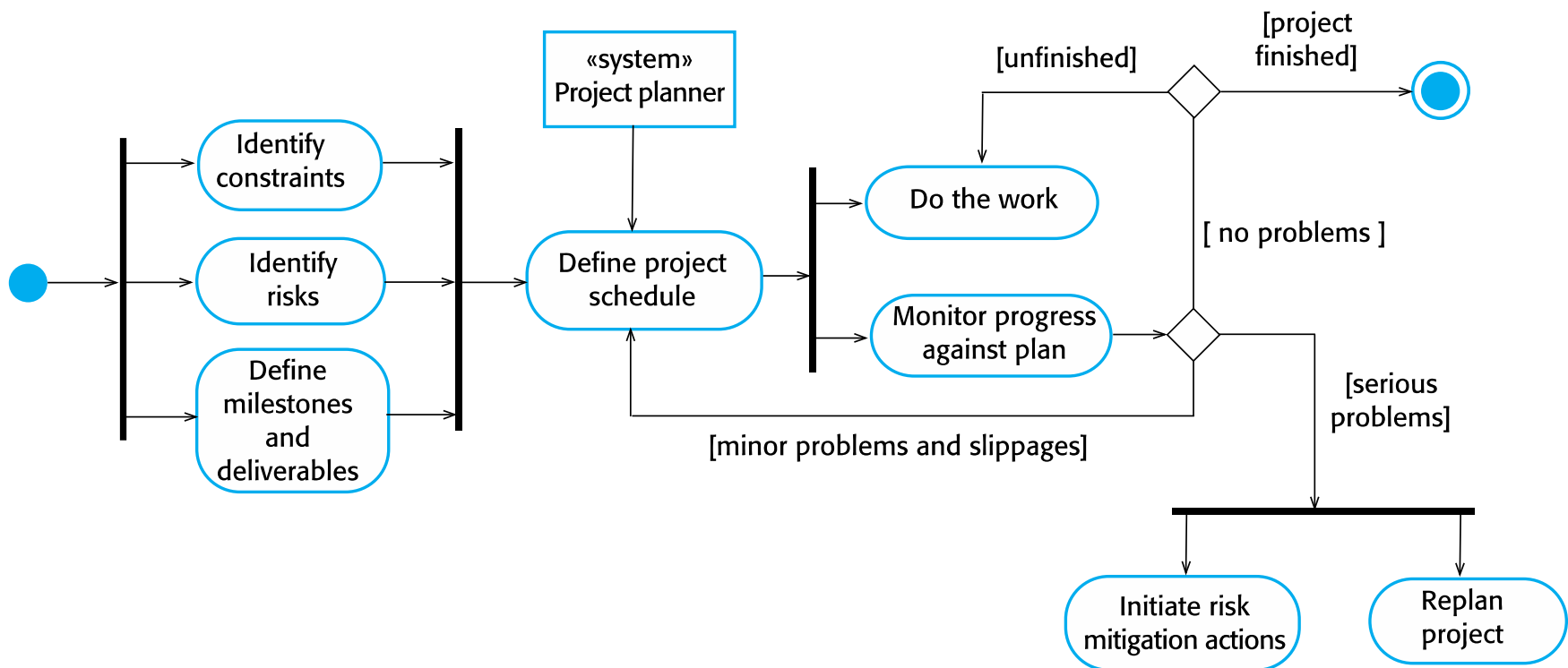- Project Plan should always be revised, and changes might be introduced

Planning Stages

- PM creates a plan before they start the project – proposal stage

- At startup phase
  - PMs plan who will work on the project
  - how the project will be broken down into increments?
  - how the resources (team members) will be allocated across your project?

- Periodically throughout the project, when you modify the plan in the light of experience gained or due issues or risks
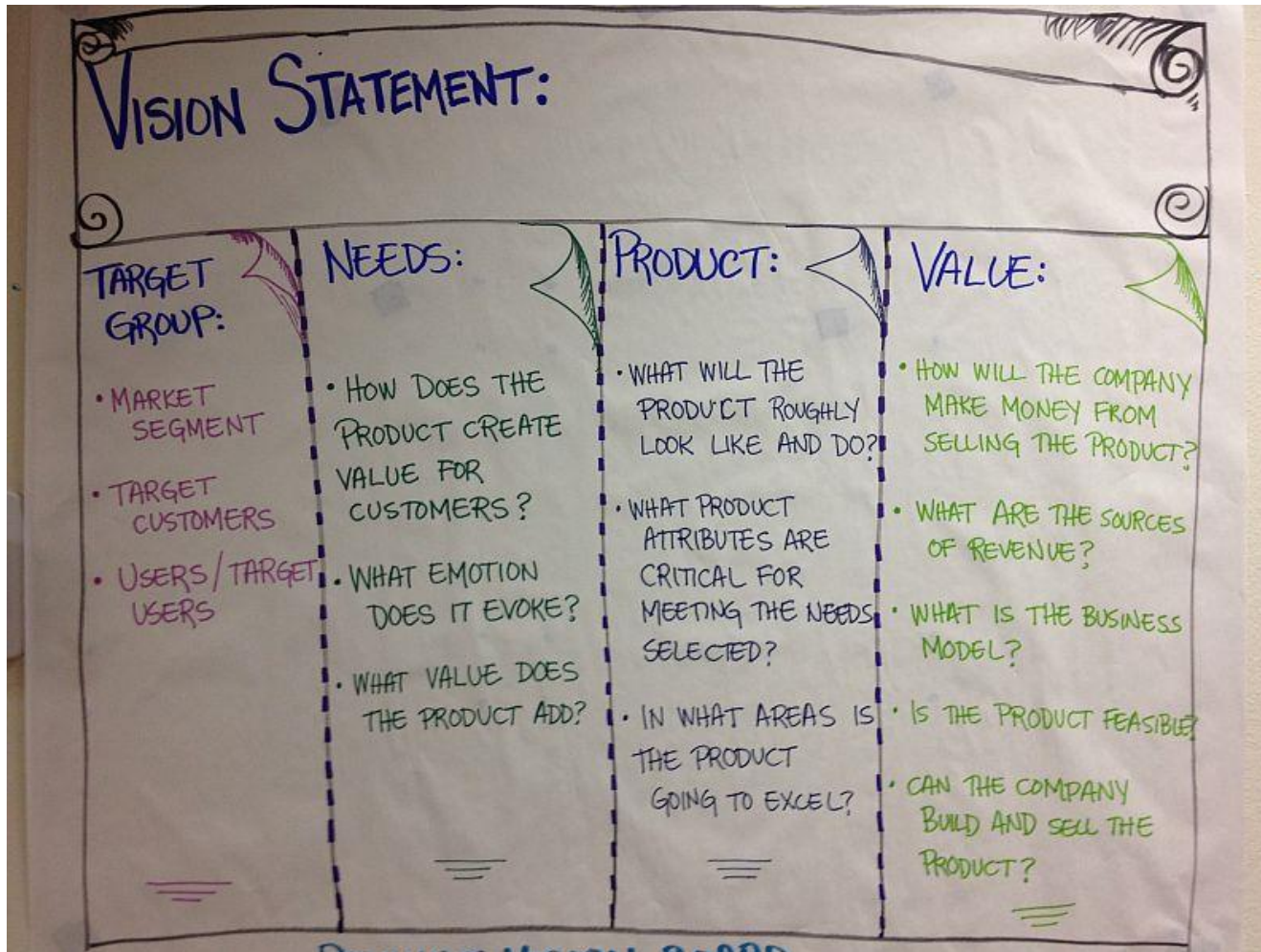
Software Pricing

- Estimates are made by the PM to discover the cost of producing a software or achieve a milestone (iteration or increment)
  - PMs consider hardware, software, travel, training and effort costs

- There is not a simple relationship between the development cost and the price charged to the customer

- Broader organisational, economic, political and business considerations influence the price charged

Summary: Project Planning Process

Course Project: Product Vision

Course Project: Product Vision

PRODUCT VISION BOARD EXAMPLE TEMPLATE

VISION

What is your purpose for creating the product?

Which positive change should it bring about?

To be the leading free electric vehicle (EV) / electric car-charging network in the world.

Having completely free electric car-charging stations in as many locations as possible will result in cleaner air, lower carbon footprint, lower cost of driving in communities, serve as a model for other forms of clean transportation, and help communities achieve climate-change goals.

TARGET GROUP

Which market or market segment does the product address?

Who are the target customers and users?

The product's target markets are existing - and potential - electric vehicle (EV) users/drivers.

NEEDS

What problem does the product solve?

Which benefit does it provide?

The product provides a solution to the relative "scarcity" of EV charging stations.

With an increase in EV charging stations, EV drivers/users will have more charging options. The prevalence of EV charging stations will also entice non-EV users/drivers to switch to EV vehicles, with the following benefits:

- cleaner air
- lower carbon footprint
- lower cost of driving in communities
- serve as a model for other forms of clean transportation
- help communities achieve climate-change goals

PRODUCT

What product is it?

What makes it stand out?

Is it feasible to develop the product?

Unique EV charging stations.

Product is differentiated in that we're partnered with the largest brick-and-mortar retailers in the US, Canada, and Mexico.

It's completely feasible to continue to develop / evolve existing product, so that our EV charging stations are *universal* for all EVs.

BUSINESS GOALS

How is the product going to benefit the company?

What are the business goals?

The primary goal is to roll out our product to more locations than any EV-charging provider.

Being the market leader will result in a 36% revenue increase for the company over a 5-year period.

Additional business goals are to continue sales and partnerships with existing -- and potential -- retail-chain locations to implement EV-charging stations in their parking lots.

Source: https://www.smartsheet.com/content/project-vision-templates

Course Project: Project Proposal

- Project name

- Project summary

- Project purpose & reason

- Project goals

- Solution proposed

- Milestones

- General activity planning

Course Project: Project Planning

- Team members initially required to do the work?

- Plan the project activities in abstract manner

- Can you estimate the cost of delivering the project?

- Specify your dependencies?

Thank You!

Next Lecture: Software Processes