Software
Engineering

Partha P Das

Software
Project
Management
Project Manager
Golden Triangle
Managing Project
Managing People

CS20006: Software Engineering
Module 07: Software Project Management

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- The job pattern of an IT company engaged in software development can be seen split in two parts
  - Software Creation
  - Software Project Management
- A project is well-defined task, which is a collection of several operations done in order to achieve a goal (for example, software development and delivery)
- A Project can be characterized as:
  - Every project may has a unique and distinct goal
  - Project is not routine activity or day-to-day operations
  - Project comes with a start time and end time
  - Project ends when its goal is achieved hence it is a temporary phase in the lifetime of an organization
  - Project needs adequate resources in terms of time, manpower, finance, material and knowledge-bank

- **Software Project**

  A *Software Project* is the complete procedure of *Software Development*
    - From *requirement gathering to testing and maintenance*
    - Carried out according to the *execution methodologies*
    - In a *specified period of time*
    - To achieve *intended software product*

Source: Software Project Management

Software Project Management: Project Manager

- A software project manager is a person who undertakes the responsibility of executing the software project through the phases of SDLC
- Project manager may never directly involve in producing the end product but he controls and manages the activities involved in production
- Project manager closely
  - monitors the development process
  - prepares and executes various plans
  - arranges necessary and adequate resources
  - maintains communication among all team members in order to address issues of:
    - cost (various expenses)
    - budget
    - resources (human, machine, etc.)
    - time (schedule and deadlines)
    - quality and
    - customer satisfaction

Source: Software Project Management

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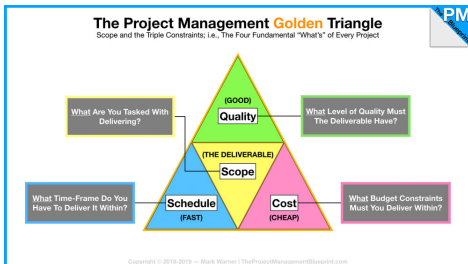# Software Project Management: Project Manager

- A project manager primarily has two responsibilities:
  - **Managing Project**
    - Defining and setting up project scope
    - Managing project management activities
    - Monitoring progress and performance
    - Risk analysis at every phase
    - Take necessary step to avoid or come out of problems
    - Act as project spokesperson
  - **Managing People**
    - Act as project leader
    - Liaison with stakeholders
    - Managing human resources
    - Setting up reporting hierarchy etc.

Source: Software Project Management

Software Project Management: Golden Triangle

- Scope and the Triple Constraints of Quality-Time-Cost
- On every project, there is an intrinsic relationship between *Scope* and the triple constraints of *Quality*, *Time*, and *Cost*
- These combined four items are referred to as a project's **Golden Triangle**
- They are also known as the four **What's** of a project:
  - What are we *tasked with building*
  - What *level of quality* it needs to be built to
  - What *time frame* do we have to deliver to; and
  - What *cost constraints* are we to build within?

Golden Triangle

- **Scope**: Scope is what we and our project team are ultimately going to produce and deliver at the end of the project – *the deliverable* of the project

  Scope is the high-level formal definition of the *What* that we're going to deliver by the end of project
- The Triple Constraints
    - **Constraint 1: Quality**: Defines "how good" the scope must be Quality is *compliance to commitments*
    - **Constraint 2: Time**: It is the *schedule* of the project – time to deliver
    - **Constraint 3: Cost**: It is the *budget* of the project – the cost within which we need to manage
- Often the Project Manager needs to choose between three options
    - *Cut Quality*: Trade off some non-essential requirements for the essential requirements
    - *Add Time*: Delay the project to give us more time to complete
    - *Add Cost*: Recruit, hire or acquire more people to do the extra work
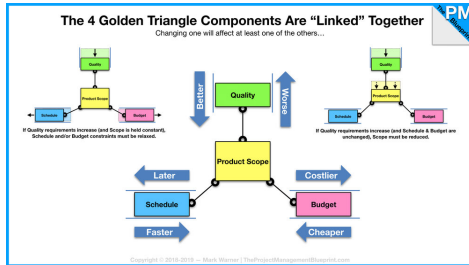
It is a continually balancing act

Source: The Project Management Blueprint

- The Golden Triangle Must Be Continually Balanced

Balancing Golden Triangle

- One part of the triangle can never be changed without affecting at least one of the other three
- PM uses several tools for *Planning*, *Monitoring*, and *Control*

Source: The Project Management Blueprint

Primary Project Management Activities include

- **Project Planning**
    - It is performed before the production of software actually starts
    - It is a set of multiple processes, which facilitates software production

- **Scope Management**
    - Define the scope
    - Decide its verification and control
    - Divide the project into various smaller parts for ease of management
    - Verify the scope
    - Control the scope by incorporating changes to the scope

- **Project Estimation**
    - *Software size estimation*
        - Line of Code (LOC) Estimation
        - Function Points Estimation
    - *Effort estimation*
        - Putnam Model: Maps time and efforts required with software size (Rayleigh curve)
        - COnstructive COst MOdel (COCOMO): Divides the software product into three categories of software: *organic*, *semi-detached*, and *embedded*
    - *Time estimation*
        - Work Breakthrough Structure (WBS)
    - *Cost estimation*: Depends on – Size of software, Software quality, Hardware, Additional software or tools, licenses etc., Skilled personnel with task-specific skills, Travel involved, Communication, Training and support

Source: Software Project Management

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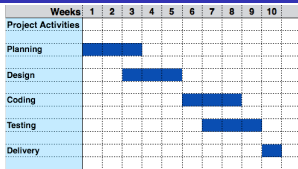Software
Project
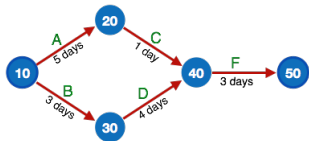Management

Project Manager
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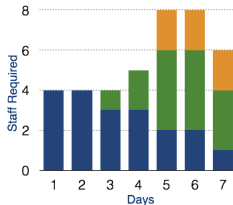● **Gantt Chart project schedule wrt time periods**

● **PERT (Program Evaluation Review Technique) Chart**

● **Resource Histogram**

Source: Software Project Management

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- What is People Management?

  People Management is defined as a set of practices that encompass the end-to-end processes of
  - talent acquisition,
  - talent optimization, and
  - talent retention

  while providing continued support for the business and guidance for the employees of an organization

- *Mantra*: **People work for their Managers**

Source: What is People Management?

- **Key Components of People Management**
  - **Create** – building a workforce that builds a better future
  - **Comprehend** – understanding the present and the future better
  - **Communicate** – opening channels to connect effectively
  - **Collaborate** – cooperating smarter, faster and stronger
  - **Confront** – optimizing on healthy differences

5 Key Components of
People Management

Create

Comprehend

Communicate

Collaborate

Confront

Source: What is People Management?

Software Project Management: Managing People

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- **5 Winning People Management Skills**
  - **Trust-building**
  - **Empathy**
  - **Motivation-mapping**
  - **Appreciating**
  - **Knowledge-seeking**

5 Winning
People Management Skills
for 2019

Trust-building

Empathy

Motivation-mapping

Appreciating

Knowledge-seeking

Source: What is People Management?