

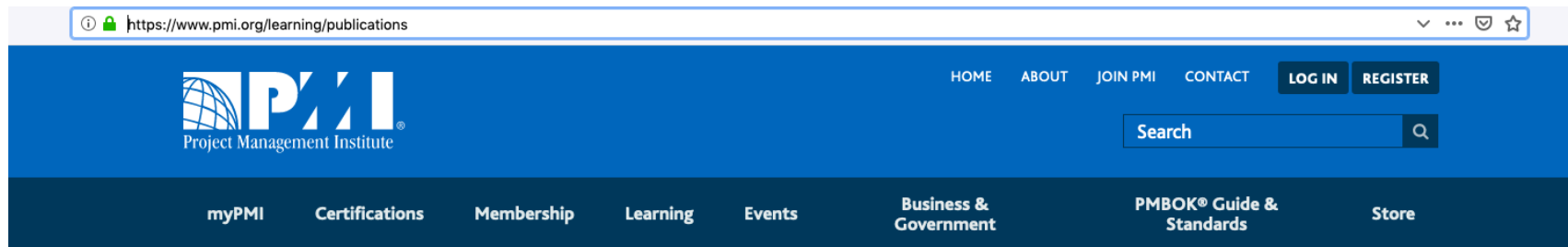
SE 329 – Software Project Management

Time and Cost Planning

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Resources

<https://www.pmi.org/learning/publications>



Learning

Publications



Project Context

Project goal: The goal of the project is to develop a low-cost fleet monitoring system. It includes a device installed in a bus that collects data from their in-vehicle networks and sends them to a remote server along with the locations.

Deliverables

1. Data collection component: A device that collects data from the car and sends them to a remote server along with the location of the vehicle
2. Data visualization: A web application that visualizes the position of each vehicles along with information collected from its network
3. Data analysis: A web application to run ad-hoc statistics using the data

Project goal

1. How much does it cost to develop the system?

1. How long does it take to develop the system?

Lecture Plan

1. Identify project activities
2. Estimate activity resources
3. Sequence activities
4. Estimate project cost

Techniques for the Identification of Activities of a Project

1. Expert judgment
2. Using WBS
3. Rolling wave planning

What Is a Work Breakdown Structure?

A **Work Breakdown Structure** (WBS) is a hierarchical decomposition of the project to create manageable pieces for the deliverables, called work packages (WP).

Approaches to Create WBS

1. Top down approach
2. Bottom up approach



https://en.wikipedia.org/wiki/Work_breakdown_structure

Top-down WBS Construction

- Decompose the scope using either
 1. Deliverables
 2. Lifecycle phases
 3. System components
 4. Other
- Decompose the components of the WBS to get a set of work packages (group of activities) or activities

Bottom-up WBS Construction

The steps are:

1. Enumerate all activities to finish the project
2. Group the activities using common themes
3. Group the themes into groups
4. Repeat the grouping until you reach the root of the tree

Advices

- The number of activities should be manageable (e.g., <100)
- The number of sub-components should be reasonable (e.g., <10)
- When dividing a component consider
 - Who will do it
 - Associated risk
 - Use for measuring progress

WBS Correctness

Conditions: Lower-level WBS components are necessary and sufficient for the completion of the higher-level component.

WBS Dictionary

- **WBS dictionary** is a document that provides details about the deliverables, activities, and information for scheduling
- Content
 - Description of work
 - Assumptions and constraints
 - Responsible organization/unit
 - Acceptance criteria
 - ...

Uses of WBS

1. Scheduling
2. Cost estimation
3. Risk identification

Example – WBS

Project goal: The goal of the project is to develop a low-cost fleet monitoring system. The expected software uses a device installed in a bus to collect data from their in-vehicle networks and send them to a remote server along with the locations.

Deliverables

1. Data collection component: A device that collects data from the car and sends them to a remote server along with the location of the vehicle
2. Data visualization: A web application that visualizes the position of each vehicles along with information collected from its network
3. Data analysis: A web application to run ad-hoc statistics using the data

Exercise

- Develop a WBS of the low-cost fleet management system using deliverables on the first level.
- Link for some of the code:
<https://github.com/lbenothmane/FleetManagement>

Example – WBS Using Deliverables

1. Preparation
 1. Acquire hardware
 2. Setup development environment
 3. Design the architecture of the system
 4. Develop project plan
2. Data collection
 1. Acquire data from the sensors
 2. Send data to server
 3. Store data in database
3. Data visualization
4. Data analysis

Example – WBS Using Project Phases

1. Requirement elicitation
2. Project planning
3. Architecture design
 1. Design the architecture of the system
 2. Design the data collection component
4. Development
 1. Develop the data collection component
 1. Data collection from the sensors
 2. Send data to server
 3. Store data in database
5. Testing
6. Delivery

Techniques for the Identification of Activities of a Project

1. Expert judgment
2. Using WBS
3. Rolling wave planning

Practice 3 - WBS

Develop one WBS for the Water Management System and specify the approach that you used (deliverables, lifecycle phases, system components, etc.)

Thank you