Research Methodology

For PSM I/II Students

Presented at FKEE, UMP

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Planning & Monitoring your Project

By

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Outline

- What Engineering Project is all about?
- How to plan & monitor your project?
- Example of project planning

Research & Development

- Research
  - Acquire new knowledge
  - Seek truth
- Development
  - Apply knowledge
  - Seek utility

A Course known as PSM…

- Course code: BEE4712/24
- Titled as Engineering Project 1 & 2
- 2 semesters long project to be taken respectively in semester 6 and 7 of an 8 semesters BEng. Program of study

Course Synopsis

The Engineering Projects involves problem solving using engineering theories and techniques, and the implementation of the project design. The student is expected to design a possible solution to the problem, taking into account various aspects such as professionalism, economy, costing and engineering viability. It is taken in two semesters. At the end of the first semester, the student is required to present his progress at a seminar and submit a short report. At the end of the second semester, it is expected that the student submits a proper written report and to present his work at a seminar

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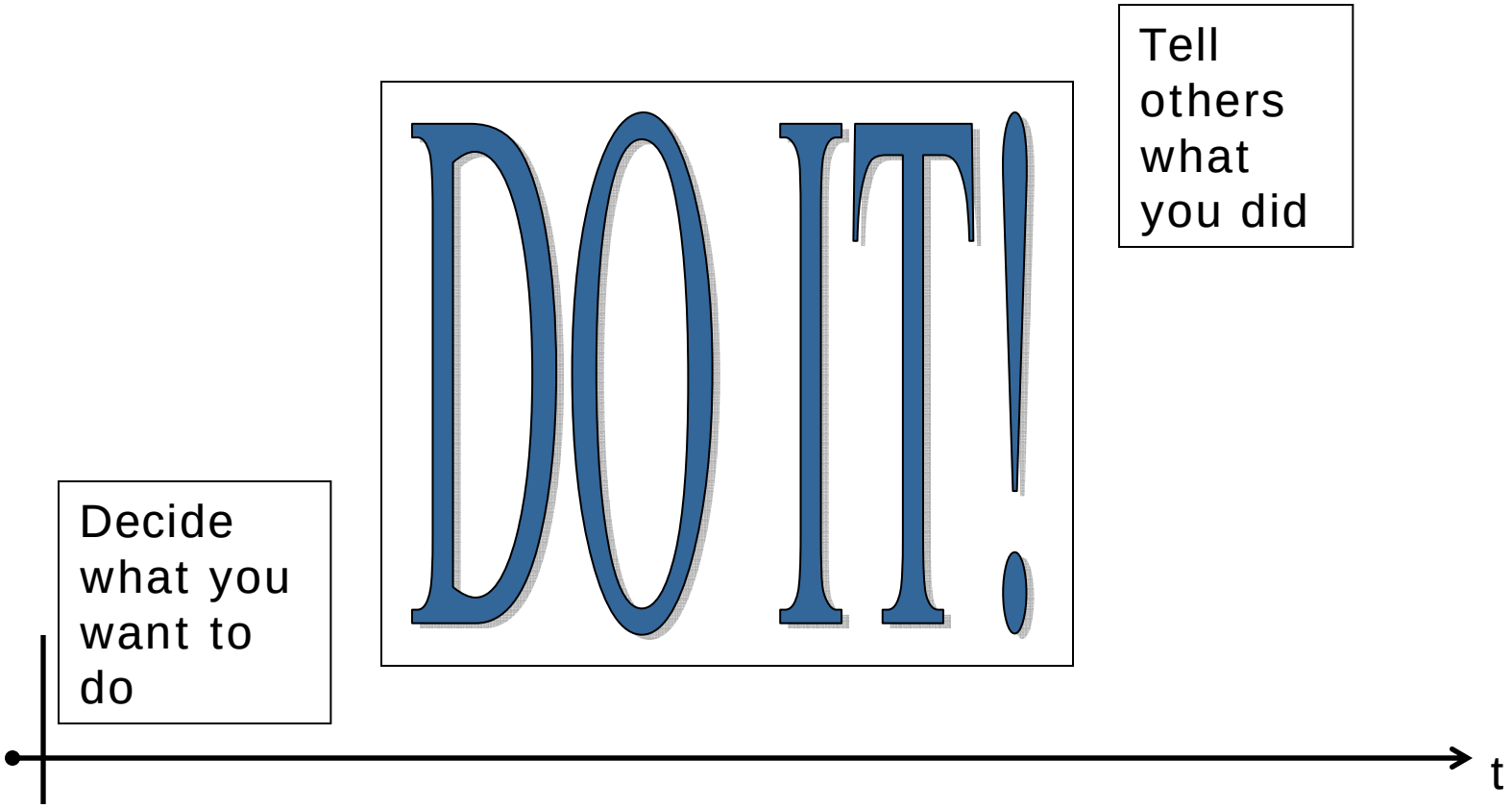
What it is all about?



What you want to do?

- Figure-out what your project is
  - Identify Problem Statement
  - Conceptualize a solution
  - Evaluate feasibility of the solution
  - Develop your hypothesis and objective
- Develop Project Proposal
  - Define your project
  - Identify your methodology

DO IT!!

- Design
  - Design inputs and design inputs review
  - Design calculation and analysis
  - Design outputs (schematic/circuit diagram)
- Develop
  - Build a model of the system or prototype unit
  - Develop test method
- Verify
  - Test and prove outcome meet objective

Scientific Approach to Experiment

- Think of an idea
- Research your topic
- Develop your hypothesis
- Plan your experiment
- Experiment (test your hypothesis)
- Collect and record data
- Come to a conclusion (about your hypothesis)

Tell others about it

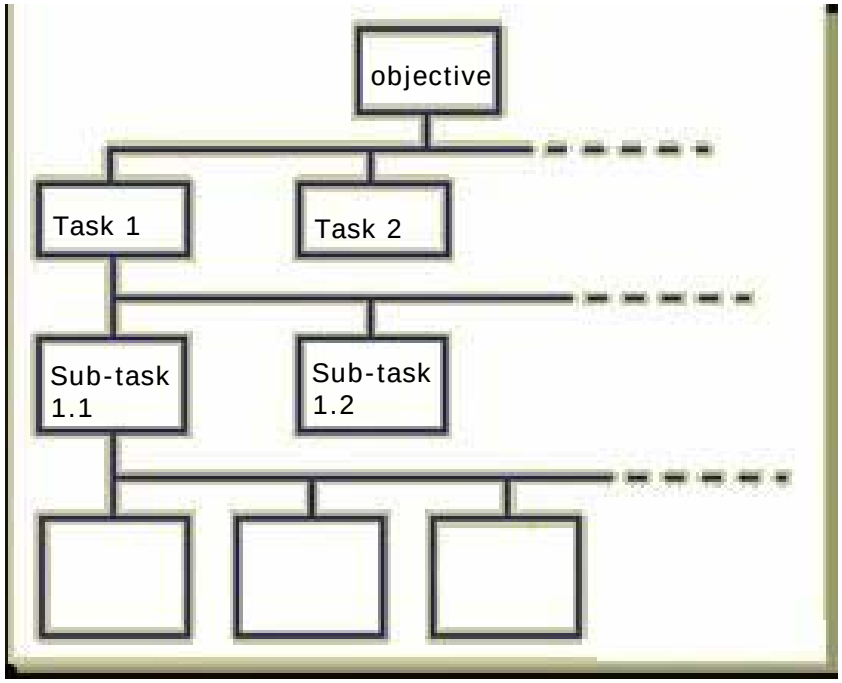
- Present your project
  - Show your design output and calculation
  - Demonstrate working prototype or model
- Report your project
  - Prepare and submit your BEng Thesis
  - Make correction and finalize your Thesis

Plan Your Project Execution

- Fail to Plan: Plan to Fail
  - If you fail to plan, you are plan to fail
  - Failures don't plan to fail; they fail to plan

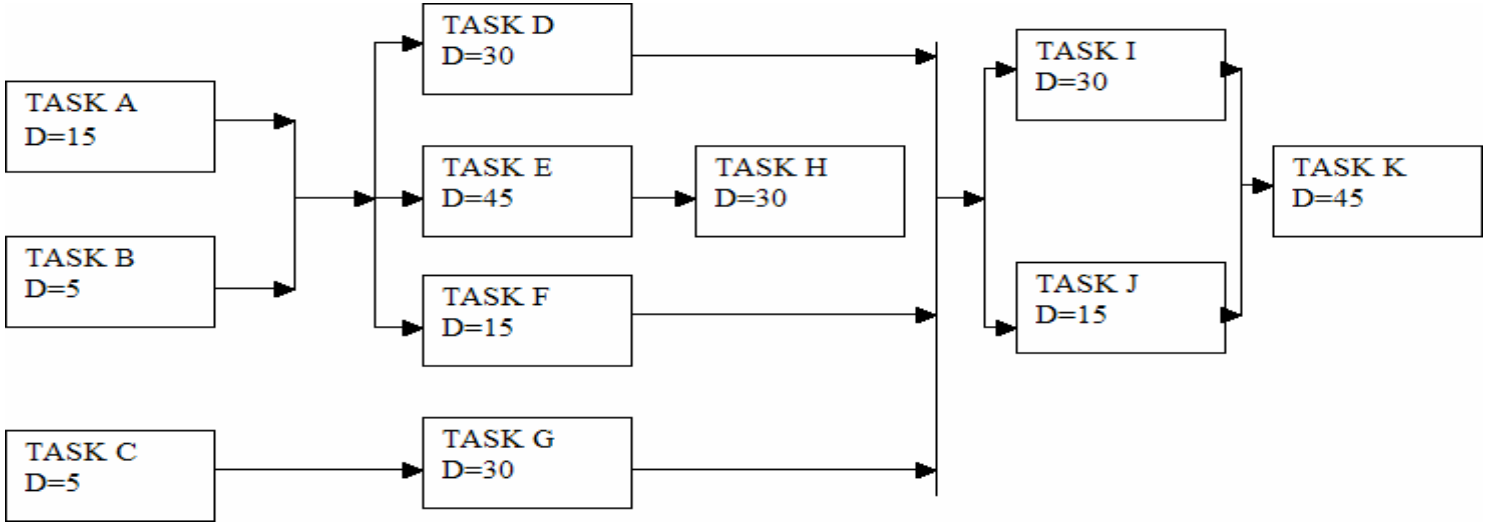
List of Tasks

- List main tasks to meet objective
- List subtasks to complete each main task
- Identify all deliverables and datelines
- Transfer to network diagram



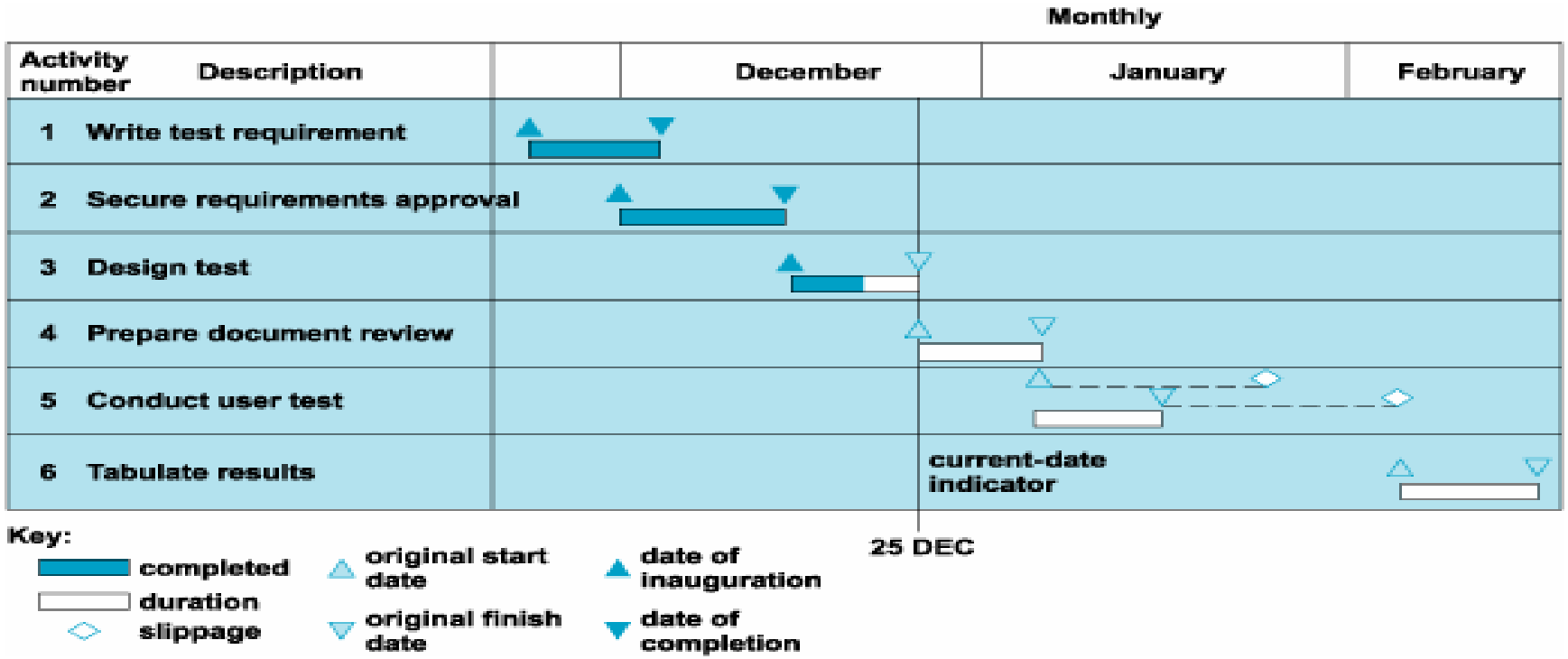
Network Diagram

- Identify
  - Start & End of each task
  - Task to start after completion of other tasks
  - Tasks done and/or start concurrently
- Arrange task in sequence of completion



Timeline

- Prepare a timeline chart or GANTT chart or Milestone chart



Monitoring and Control

- Allocate time for your project
- Use your Timeline chart as guide
- Tackle one task at a time
- Be prepared to revise your plan
- Meet with supervisor REGULARLY

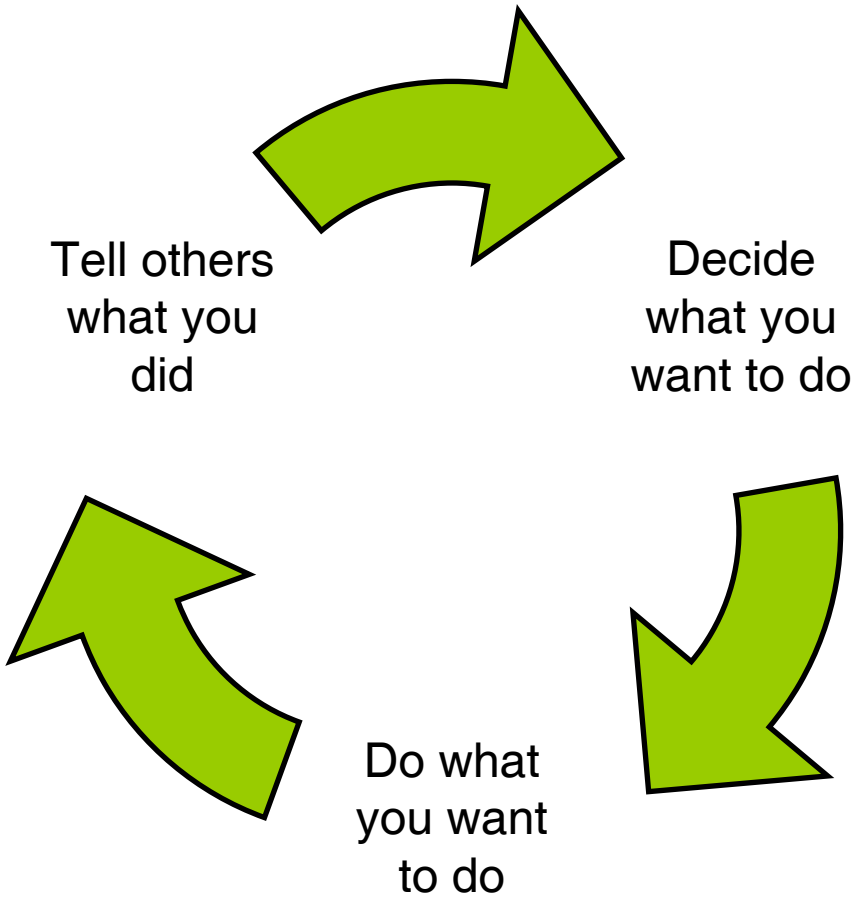
Maintain a Logbook

- A complete record of your project work
- Include notes of your research, readings, discussions, sketches, drawings and thoughts
- Record design calculation and analysis
- Record experiment design & results
- Minute all project meetings

Guideline for Maintaining a Logbook

- Put EVERYTHING in your logbook
- Date every new entry
- Record TITLE and OBJECTIVE of each notes, calculation, experiment, test etc
- Paste print-outs or photocopies of important information
- Include source of your reading/reference
- Use PEN and only cross-out mistake

Putting Theory in Practice



Situation Critical…

- It's two in the morning. Just finish gaming and chatting with friends online. Now only feel very hungry. Stomach making a lot of noise. Cannot sleep when hungry.
- Feel hungry during wee hours of the night

Solutions

- Go out to eat at cafeteria
- Go out to eat at Gambang Service Center
- Eat MAGGI MEE

Objective

- To prepare a quick nutritious meal of MAGGI MEE

Methodology

- Cook MAGGI on stove – put MAGGI in a pot of water and leave to boil
- Cook MAGGI in a bowl – boil water and pour hot water onto a bowl of MAGGI
- Cook MAGGI in microwave – put MAGGI in a bowl of water and heat in microwave

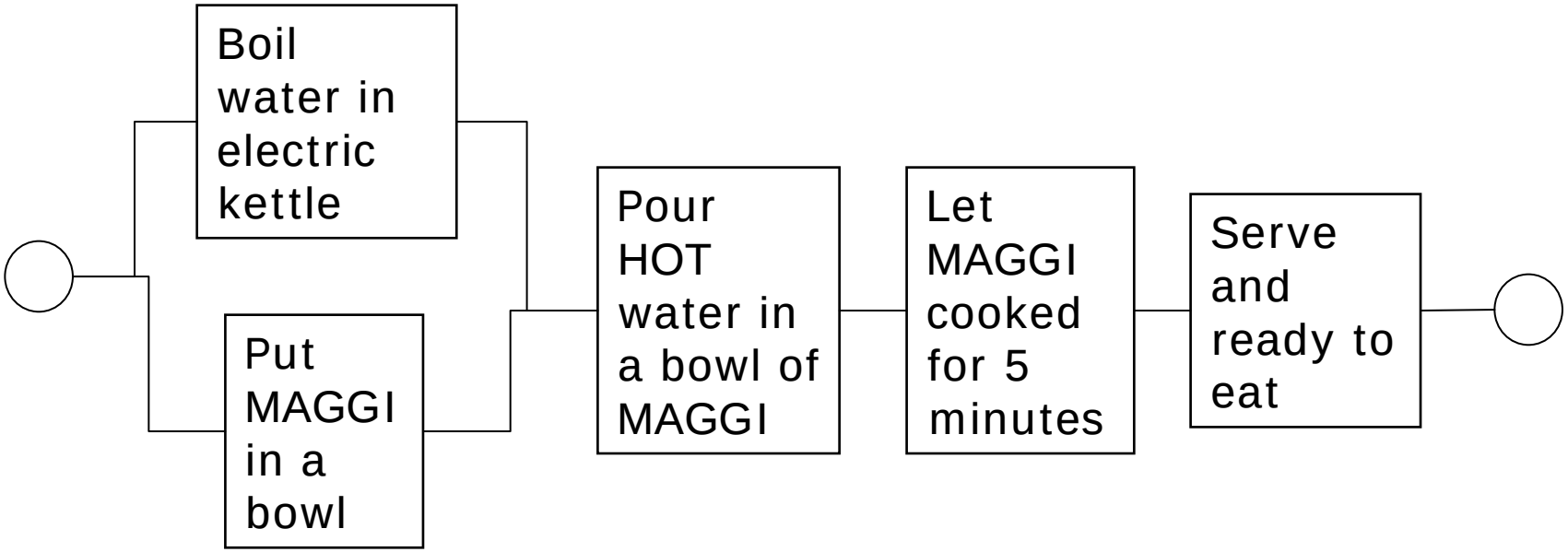
Assumption

- Clean dishes available
- Electric kettle available
- Kettle already filled with water
- MAGGI comes in packet
- ...

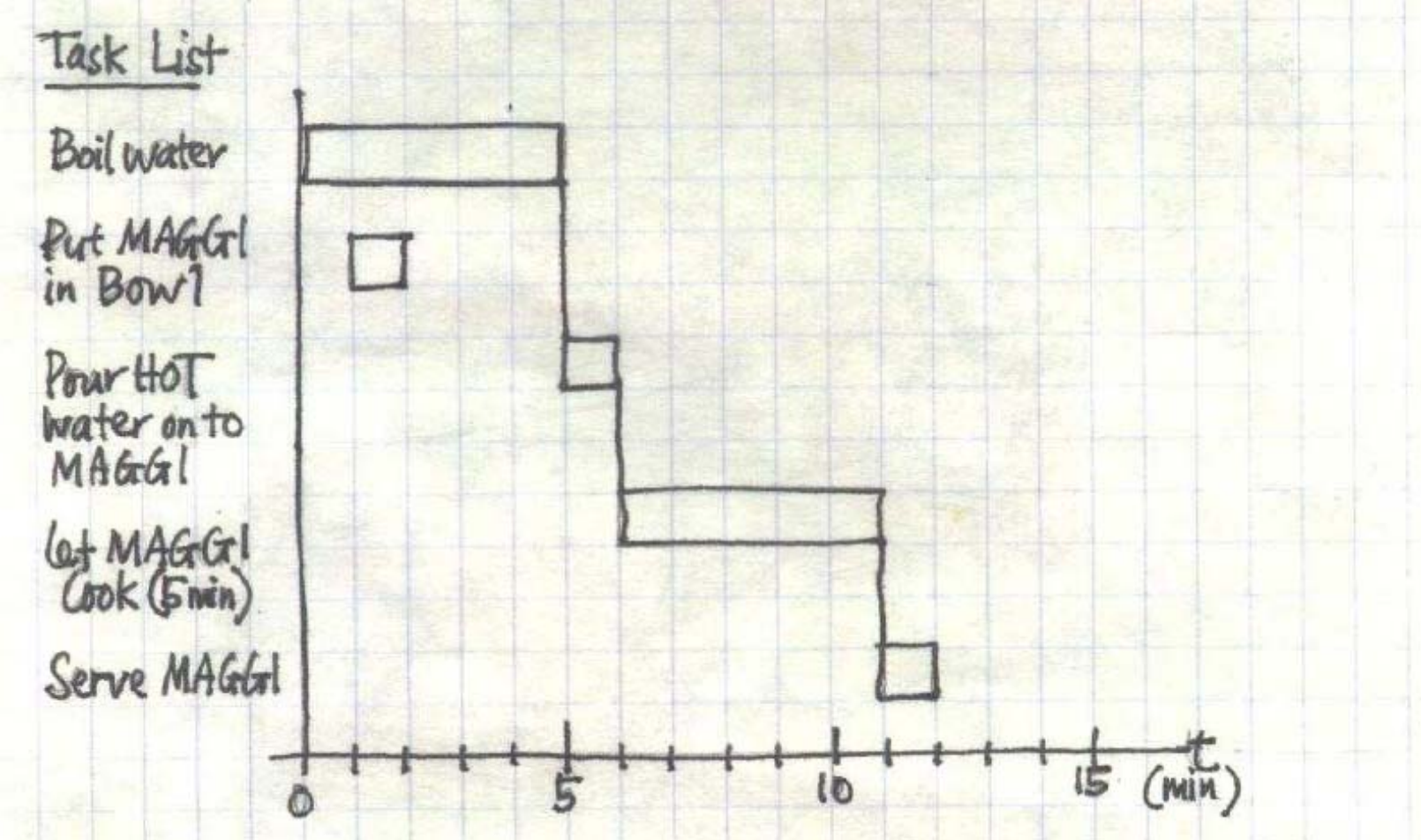
List of Tasks

- Boil water in electric kettle
- Put a pack of MAGGI in a bowl
- Pour boiling/hot water into a bowl of MAGGI, add seasoning
- Cook for 5 minutes
- Serve in a bowl with fork & spoon

Workflow Diagram



Timeline Chart



DO & Tell…

- Execute your plan – cook your MAGGI
- Test it!
- Enjoy your MAGGI
- Tell the others about it

Further Readings

- http://en.wikipedia.org/wiki/Scientific_method
- http://en.wikipedia.org/wiki/Project_management
- S.E. Portny, *Project Management for Dummies*, Wiley:USA, 2001

Summary

- Engineering project is...
- Planning process starts with...
- Use timeline/milestone/Gantt chart to...
- Record progress...
- Meet with Supervisor REGULARLY

Any Question?

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"When you know what you think, you succeed in saying what you think, in making yourself understood. When you don't know what you think, your expressive tongue halts"

Literary Taste by Arnold Bennett

The END

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