

MANAGING SOFTWARE PROJECTS



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What is a project?

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A temporary endeavor undertaken to create a unique product, service, or result.

 *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Seventh Edition and The Standard for Project Management*, Project Management Institute, Newtown Square, PA, 2021.

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A project must have

- ▶ **beginning** and **end**
- ▶ clear **goal**

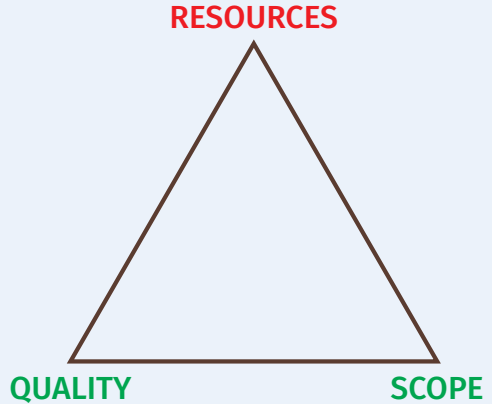
The golden/iron/project triangle



- ▶ **QUALITY**: non-functional requirements
- ▶ **SCOPE**: functional requirements
- ▶ **COST**: budget/human constraints
- ▶ **TIME**: delivery constraints

Model: **SCOPE** = **TIME** × **COST**

Good, fast, cheap: choose two



Difference: All constraints are now in **RESOURCES**

The iron triangle in software projects



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Requirements

Non-functional (QUALITY)

Functional (SCOPE)

Requirements

Non-functional (QUALITY)

- ▶ performance
- ▶ reliability
- ▶ scalability
- ▶ security
- ▶ documentation
- ▶ extensibility

Functional (SCOPE)

Requirements

Non-functional (QUALITY)

- ▶ performance
- ▶ reliability
- ▶ scalability
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Functional (SCOPE)

- ▶ features of the software
- ▶ data software can handle
- ▶ required user interactions

Constraints

- ▶ software
- ▶ hardware
- ▶ peopleware
- ▶ delivery deadlines

- 📖 P. G. Neumann. *Peopleware in systems*. in Peopleware in Systems. Association for Systems Management, Cleveland, OH, 1976, pp. 15-18.
- 📖 T. DeMarco and T. Lister. *Peopleware: Productive Projects and Teams*. Addison-Wesley, 2013.

Iron triangle—messages




- ▶ Constraint/requirements **can** change
- ▶ Any change requires adjustments
- ▶ Tool for analysis, **not** assessment
- ▶ Impact on stakeholders is missing

Model: **SCOPE** = **TIME** × **COST**


What is software engineering?

Engineering is about getting results of the required quality within schedule and budget. This often involves making compromises—engineers cannot be perfectionists.

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Core **hard skills**, but **soft skills** are also involved!

Summary

1. What falls under **QUALITY**?
2. What falls under **SCOPE**?
3. What falls under **RESOURCES**?
4. What is **SOFTWARE ENGINEERING**?