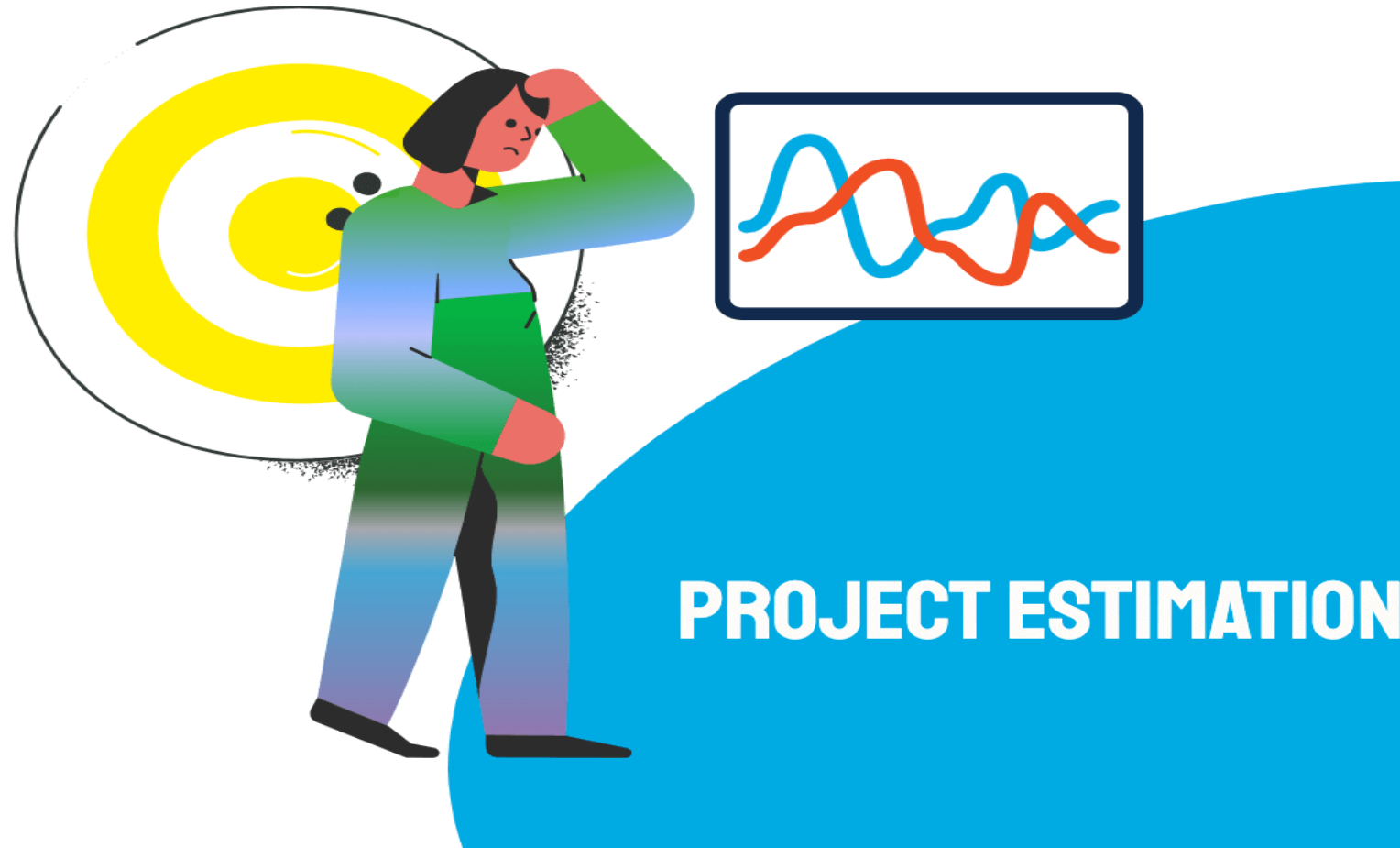# Estimation for Software Projects

Introduction

Estimation

- Estimation is the technique of calculating or computing the various quantities and the expected expenditure to be incurred on a particular work or project.
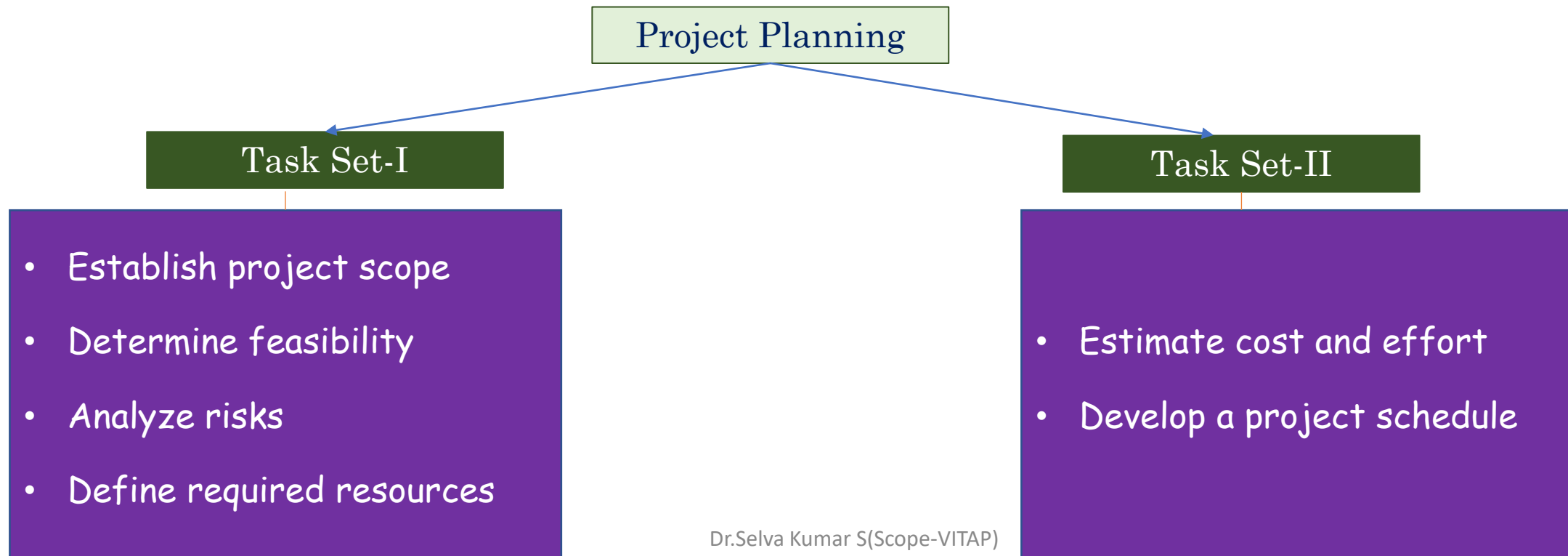
- Software project management begins with a set of activities that are collectively called project *planning*.

- Before the project can begin, the software team should estimate the work to be done, the resources that will be required, and the time that will elapse from start to finish.

- The overall goal of project planning is to establish a pragmatic strategy for controlling, tracking, and monitoring a complex technical project.
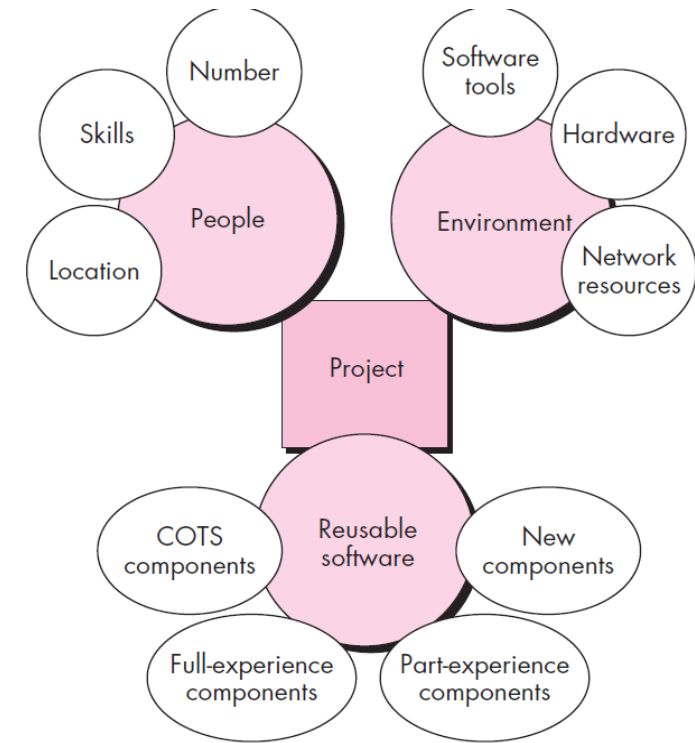
Software Project Planning

Project Planning

- This phase is the longest and most important of the project cycle. Without proper scope planning, a project has a poor chance of success.

- The two sets of tasks will be accomplished during project planning.

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                        ┌─────────────────────┐
                        │  Project Planning   │
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Task Set-I	Task Set-II
• Establish project scope	
• Determine feasibility	• Estimate cost and effort
• Analyze risks	• Develop a project schedule
• Define required resources	

Project Planning Task Set-I

- Software scope describes the functions and features that are to be delivered to end users, the data that are input and output.

- The second planning task is an estimation of the resources required to accomplish the software development effort.

  - Human Resources

  - Reusable Software Resources

    - Component-based software engineering

      Off-the-shelf components

      Full-experience components

      Partial-experience components.

      New components.

  - Environmental Resources

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Software Project Estimation

- Software cost and effort estimation will never be an exact science.

- Too many variables—human, technical, environmental, political—can affect the ultimate cost of software and the effort applied to develop it.

Estimation of resources, cost, and schedule for a software engineering effort requires

- Experience

- Access to good historical information (metrics)

- The courage to commit to quantitative predictions when qualitative information is all that exists

Estimation carries inherent risk and this risk leads to uncertainty.
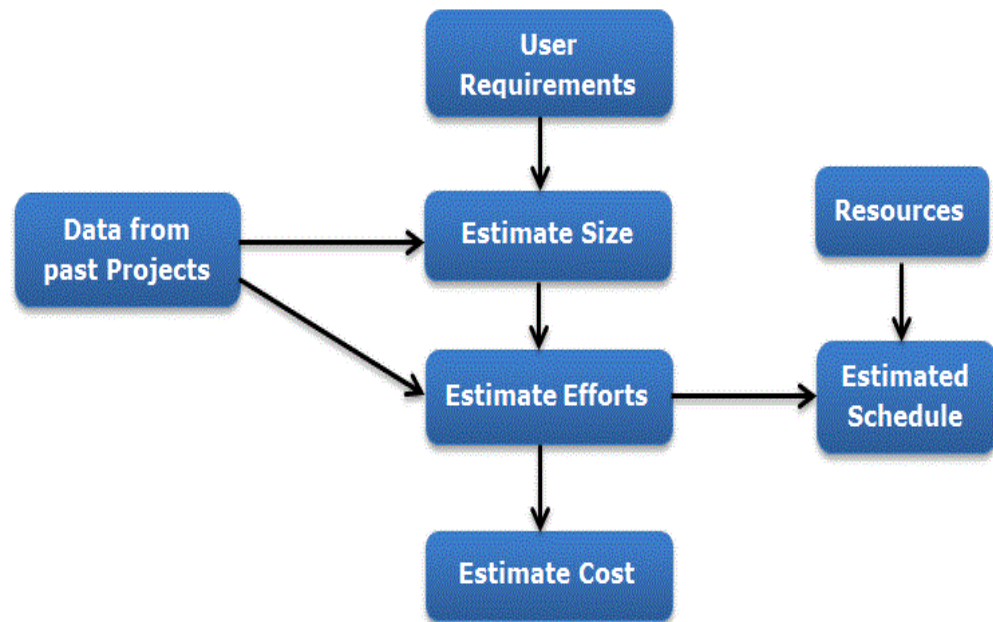
Software Project Estimation

So good software Project Estimation,

- Project scope must be understood

- Elaboration (decomposition) is necessary

- Historical metrics are very helpful

- At least two different techniques should be used

- Uncertainty is inherent in the process

Software Project Estimation

Project Estimation Process

- Estimating the size of the software to be developed is the very first step to making an effective estimation of the project.

- The next step is to estimate the effort based on the size (Efforts are estimated in the number of man-months)

- Estimating the project schedule from the effort estimated.

- the cost of a project is derived not only from the estimates of effort and size but from other parameters such as hardware, travel expenses, telecommunication costs, training cost etc. should also be taken into account.

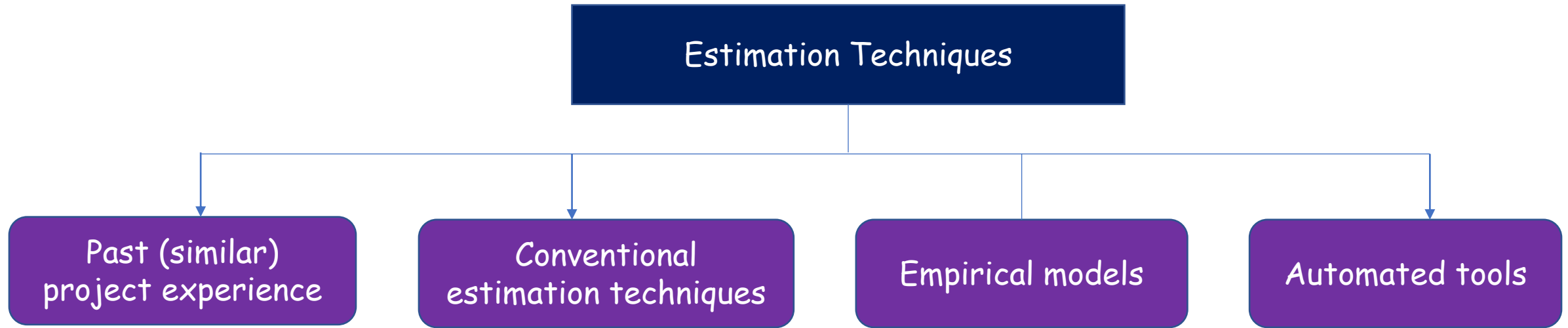# Software Project Estimation

Project Estimation Process

- *Software managers, cognizant engineers, and software estimators are responsible for project estimation.*

Software Project Estimation

Estimation Techniques

Software Project Estimation

Estimation Accuracy

- Accuracy is an indication of how close something is to reality. Whenever you generate an estimate, everyone wants to know how close the numbers are to reality.

Important factors that affect the accuracy of estimates are –

- The accuracy of all the estimate's input data.

- The accuracy of any estimate calculation.

- How closely is the historical data or industry data used to calibrate the match the project you are estimating?

- The predictability of your organization's software development process.

- The stability of both the product requirements and the environment that supports the software engineering effort.

- Whether or not the actual project was carefully planned, monitored and controlled, and no major surprises occurred that caused unexpected delays

Software Project Estimation