

CSC3031 - Research and Project Skills

Project Skills: Planning your Project

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Project Skills: Planning your Project

In this session we will provide an overview of approaches to planning and risk management that don't overwhelm your project but help you to stay on track.

Overview:

1. Introduction: “Good, Fast, Cheap”
2. Planning
3. Watching Risks

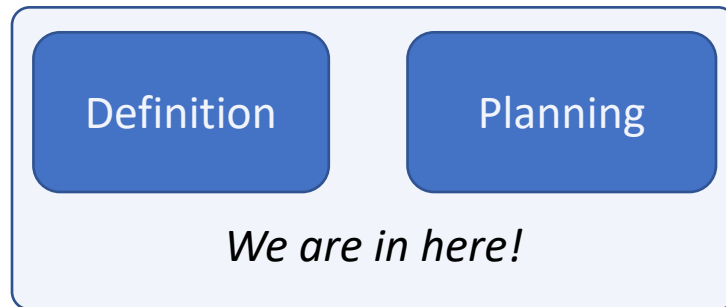
1. Introduction

- A project plan helps ensure you have a direction and ensure you complete on time.
- It's about **balancing**:
 - Time
 - Resources
 - Quality & Scope

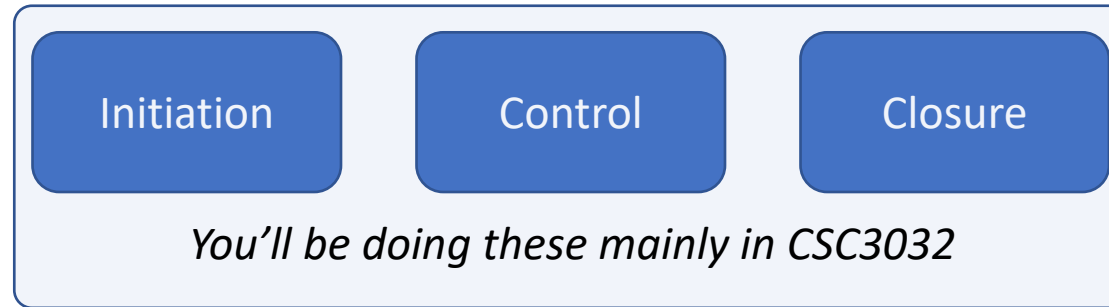


1. Introduction

- Project activities are not (necessarily) ordered tasks
- We tend to spend more effort on the later ones in later phases



- Deciding on a project
- Identifying aims and objectives
- Deciding how to fulfil your aim and objectives



- Ensuring you have what you need
- Monitoring and correcting
- Re-planning
- Eventually producing your dissertation

2. Planning

- In planning we try to look realistically at
 - A breakdown of tasks
 - Estimating the resources required to complete them,
 - Fixing your milestones
 - Scheduling the tasks – and rescheduling!
- The good news is this is normally pretty straightforward for an individual 1-person project.
- It's a vast challenge for multi-team complex projects involving lots of suppliers. Project managers are exceptionally valuable and highly trained.

2. Planning: work breakdown

- You can use a simple Work Breakdown Structure to decompose the project to lower level tasks.
- Try using your objectives as the first layer of a WBS – do they cover everything you'd expect to do?

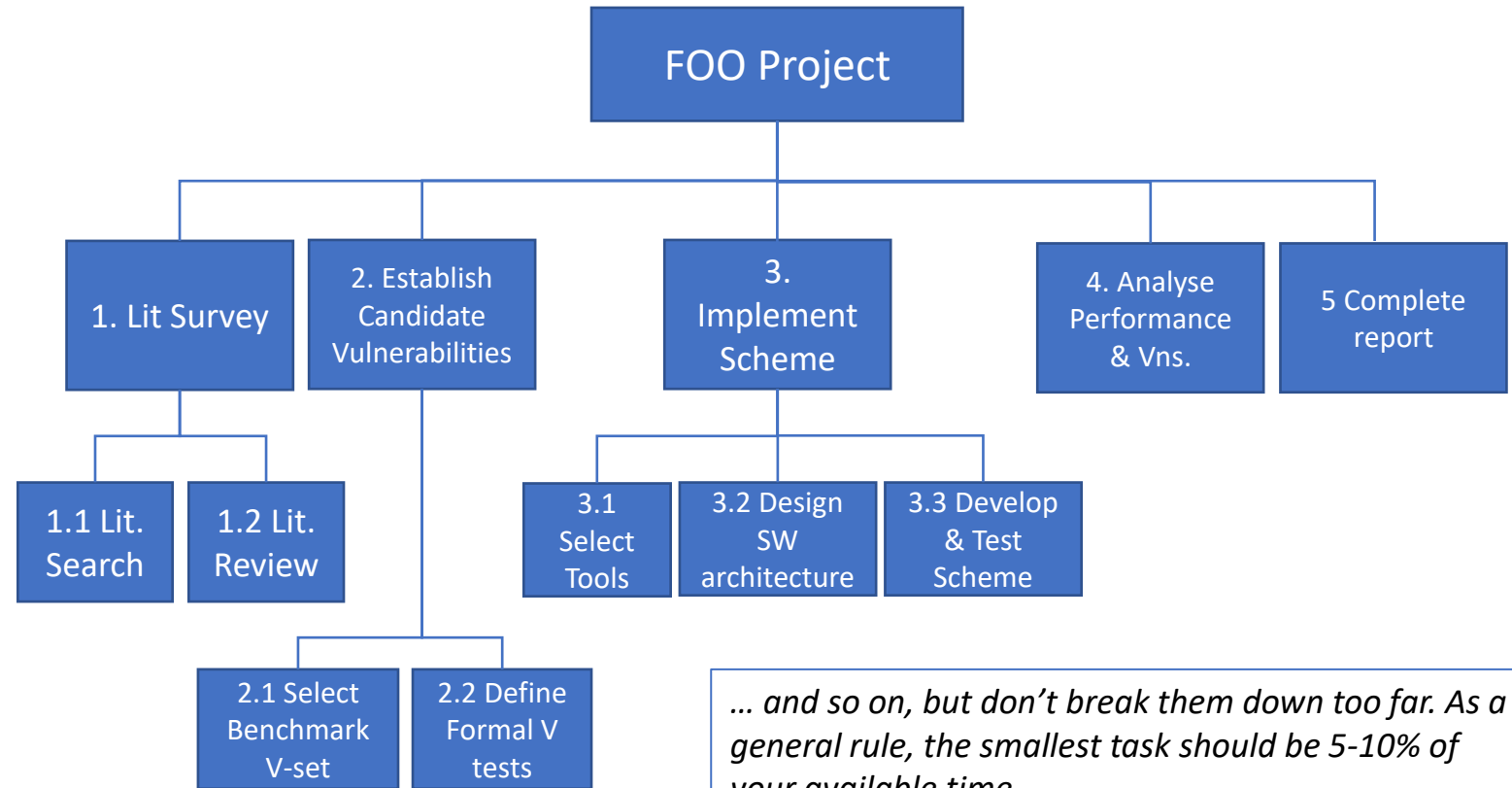
2. Planning: work breakdown

Aim:

- An analysis of the performance and vulnerabilities of the Fujioka Okamoto Ohta (FOO) e-voting scheme

Objectives:

1. Research and summarise published analysis of current e-voting schemes (Literature Survey)
2. Establish candidate set of vulnerabilities to investigate
3. Implement the FOO e-voting scheme
4. Analyse the performance and vulnerabilities of the FOO implementation
5. Complete report



... and so on, but don't break them down too far. As a general rule, the smallest task should be 5-10% of your available time.

2. Planning: time estimates

- Consider all the lowest level activities
- Estimate the time you would need to give to each task.
- When you see them all, you may need to:
 - Re-estimate if you were too conservative or too liberal
 - Re-evaluate your objectives themselves if they exceed the available effort

| Activity | Estimated duration (weeks) |
|-----------------------------|----------------------------|
| 1.1 Lit. search | 0.5 |
| 1.2 Lit. review | 0.5 |
| 2.1 Select benchmark V-set | 0.5 |
| 2.2 Define formal V-tests | 1 |
| 3.1 Select Tools | 0.5 |
| 3.2 Design SW architecture | 1 |
| 3.3 Develop & Test Scheme | 3 |
| 4 Analyse performance & Vns | 1 |
| 5 Complete Report | 2 |
| Total | 10 |

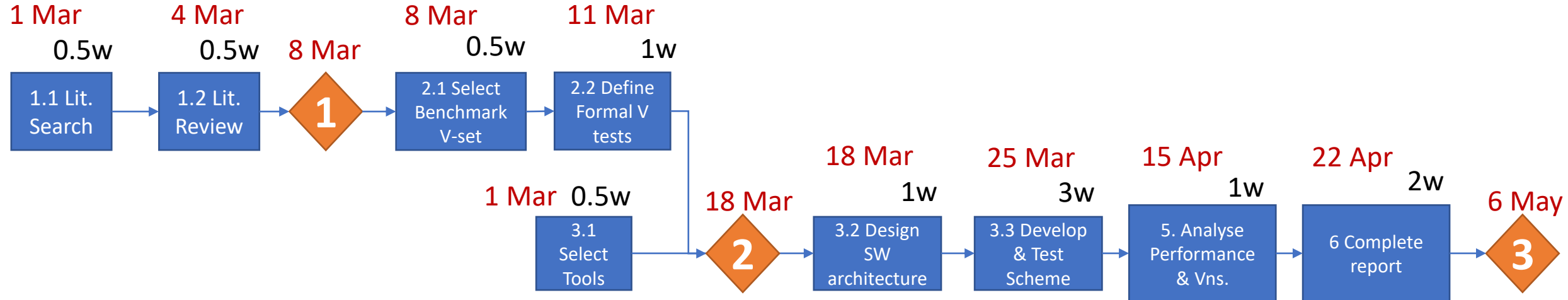
2. Planning: what are your milestones?

- Milestones represent major steps along the way.
- Base them on your objectives, but not necessarily every one.
- They're waypoints against which to judge progress.

| Activity | Estimated duration (weeks) | |
|-----------------------------|----------------------------|---|
| 1.1 Lit. search | 0.5 | |
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| 3.2 Design SW architecture | 1 | |
| 3.3 Develop & Test Scheme | 3 | |
| 4 Analyse performance & Vns | 1 | |
| 5 Complete Report | 2 | 3 |
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2. Planning: sequencing your activities

- PERT charts plot out the dependencies – you need the output from one task in order to complete another.
- Annotate tasks with time estimates and possible start dates
- Tasks “on the critical path” will delay the overall completion if they are themselves delayed.
- This tends to assume that you can perform tasks in parallel and that they are done in single blocks.



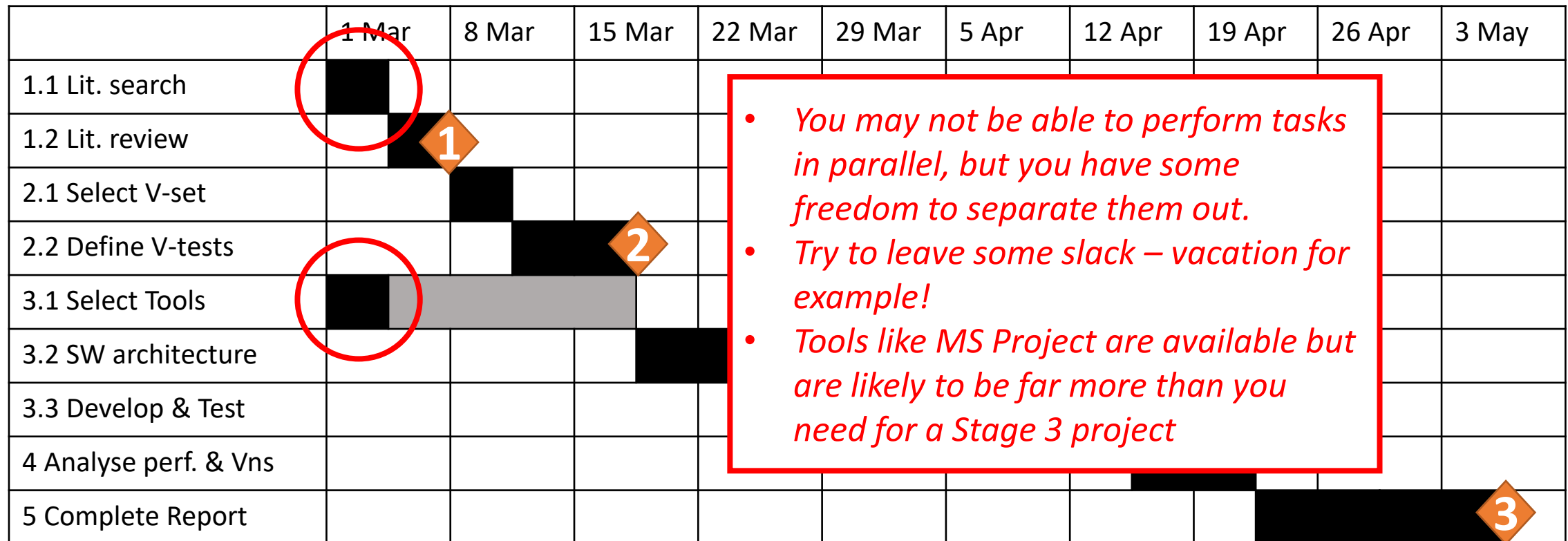
2. Planning: scheduling

- Gantt charts show the real temporal duration of activities and let you plan out actual timings.

| | 1 Mar | 8 Mar | 15 Mar | 22 Mar | 29 Mar | 5 Apr | 12 Apr | 19 Apr | 26 Apr | 3 May |
|-----------------------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|
| 1.1 Lit. search | ■ | | | | | | | | | |
| 1.2 Lit. review | | 1 | | | | | | | | |
| 2.1 Select V-set | | ■ | | | | | | | | |
| 2.2 Define V-tests | | | ■ | 2 | | | | | | |
| 3.1 Select Tools | ■ | ■ | ■ | | | | | | | |
| 3.2 SW architecture | | | | ■ | | | | | | |
| 3.3 Develop & Test | | | | | ■ | ■ | ■ | | | |
| 4 Analyse perf. & Vns | | | | | | | | ■ | | |
| 5 Complete Report | | | | | | | | | ■ | 3 |

2. Planning: scheduling

- Gantt charts show the real temporal duration of activities and let you plan out actual timings.



2. Planning: re-planning

- If you believe there's a weakness in your plan, feel free to adjust it
 - Modify the effort or duration estimates
 - Move tasks around
 - Ultimately, you might have to consider modifying the tasks themselves
 - ... or plan to have periods of much heavier work.
- You'll very likely want to re-plan during the project – this is fine and quite routine
 - Few projects go according to the initial plan
 - It's just vital to be honest with yourself and your supervisor and re-plan when you need to.

3. Managing Risks

- Larger projects will tend to put serious effort in defining and monitoring risks.
- We don't require a big risk analysis, but it is worthwhile undertaking.
- There are similarities to project planning, notably that you:
 - Identify risks
 - Assess their impact
 - Manage critical risks
 - Control risks through the project.

3. Managing Risks: identifying risks

- A Risk is something that occur (event, condition) that affects your project plan
- Identify Categories of Risk
- Technical: consider the elements you need, e.g.,
 - Availability of Hardware and Software, technical services (e.g., cloud)
 - Technical skills/knowledge (how well do you know that programming language?)
 - Is the specification clear enough? Will requirements change?
 - Chance of losing all your data?
- Non-technical, e.g.,
 - Illness (you, your supervisor?)
 - Overrunning your time estimates

3. Managing Risks: assessing impact

- **Risk Impact = Likelihood*Severity**

- Typically, scores are assigned for the considered likelihood and severity of consequences if a risk should be realised, e.g.,

| Likelihood | Score | Probability |
|------------|-------|-------------|
| Certain | 6 | 100% |
| Very High | 5 | 80% |
| High | 4 | 60% |
| Medium | 3 | 40% |
| Low | 2 | 20% |
| Very Low | 1 | 5% |

| Severity | Score |
|-----------|-------|
| Very High | 5 |
| High | 4 |
| Medium | 3 |
| Low | 2 |
| Very Low | 1 |

| Likelihood | Severity | | | | | |
|------------|----------|---|----|----|----|----|
| | SCORE | 1 | 2 | 3 | 4 | 5 |
| | 1 | 1 | 2 | 3 | 4 | 5 |
| | 2 | 2 | 4 | 6 | 8 | 10 |
| | 3 | 3 | 6 | 9 | 12 | 15 |
| | 4 | 4 | 8 | 12 | 16 | 20 |
| | 5 | 5 | 10 | 15 | 20 | 25 |
| | 6 | 6 | 12 | 18 | 24 | 30 |

Red-Amber-Green (RAG) often used as a shorthand for risk scores

- In larger projects, severity is broken down into effects on cost, time, or quality, e.g.,

| Cost impact | | | |
|-------------|---|---------------|-----|
| £100,000 | 5 | Severe | 10% |
| £80,000 | 4 | Major | 8% |
| £60,000 | 3 | Moderate | 6% |
| £40,000 | 2 | Minor | 4% |
| £20,000 | 1 | Insignificant | 2% |

| Time impact | |
|-------------|---|
| 20 - 60 | 5 |
| 5 - 20 | 4 |
| 1 - 5 | 3 |
| 0.5 - 1 | 2 |
| 0 - 0.5 | 1 |

| Quality impact | |
|----------------|---|
| Very High | 5 |
| High | 4 |
| Medium | 3 |
| Low | 2 |
| Very Low | 1 |

Then calculate severity as some function of these, weighting the impacts depending on priorities.

3. Managing Risks: critical risks

- A **Risk Register** is used to record the risk, its Risk Impact Score, the trigger event that leads us to suppose the risk will go live, and the action that we take to manage the risk.
- **Green risks** are often just accepted: we live with them.
- **Amber risks** are watched with care in case the trigger conditions arise
- **Red Risks are critical and always have actions to manage them**

3. Managing Risks: managing & controlling

Some ways of managing project risks

- **Avoidance: modify plans to reduce source of risk, e.g.,**
 - You need to use a programming language that's new to you – risk is you may not gain competence in it quickly enough. Use a language you know instead.
- **Contingency: build in slack or redundancy, e.g.,**
 - If you're working on your own computer, but you lose access to the drive where you've been writing your dissertation. Do frequent backups so you can use university systems.
- **Transfer: put the risk elsewhere, e.g.,**
 - You're building a piece of software and wanted to code up an algorithm but don't know that you'll have time. Manage the risk by substituting an off-the-shelf one instead – but you'd need permission, and ensure attribution!
- **Controlling risks through-project, e.g.,**
 - Review your risk register periodically (e.g. at milestones, or fortnightly). Not fun, but worth it when you manage to dodge a lightning bolt!

Remarks: how does this affect your project?

- Don't spend more than 10% of your effort on project management
- Plan the whole project: include testing, evaluation, and all the deliverables.
 - Be realistic in your time estimates
 - Discuss your plan with your supervisor
- Consider risks: it's not obligatory to have a full risk register, but worth it as a tool
- Get value from your plan by maintaining it during your project
 - They're your deadlines, you set them for yourself, so try to respect them
 - Be honest if your plan changes – you won't be penalised!

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