
Software project planning

The Plan, project estimation,
decomposition, tools

(Pressman / Software Engineering / Chapter 5)

Effective team meetings

- Use an AGENDA, distributed in advance
 - People should know what is to be discussed
- Use team meeting for
 - Analyzing, reporting what has been done
 - Plan what should be done next
 - Making decisions
 - NOT FOR DOING THE WORK
 - Exception: "brain-storming activities"

Simple AGENDA

GROUP A MEETING, DC 3101 Nov 7. at 10.15

Present: NN, NN, NN, NN

AGENDA:

- * Code status (dev manager)
- * Decision on testing tools
- * The documentation templates (process manager)
- * Test plan (testing manager)
- * Next meeting

Agenda distributed 1-10 days before meeting

The process

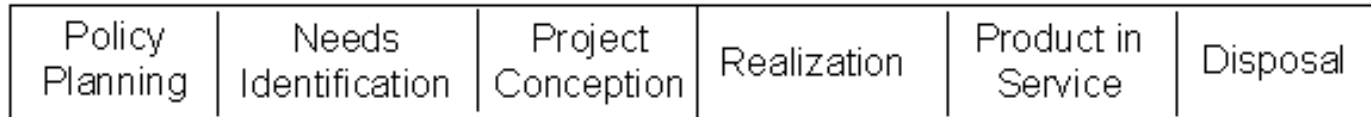
- Some process is normally ;) used for generating software
 - linear
 - prototyping
 - RAD
 - incremental
 - spiral
 - WINWIN
 - component-based
 - formal methods

Process / product

- Example: Software process involving
 - Customer communication
 - Planning
 - Risk analysis
 - Engineering
 - Construction and release
 - Customer evaluation
- Map each of these activities to the product functions

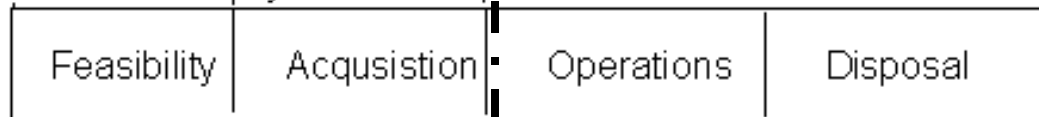
Project lifecycle relationships

Business Life Cycle

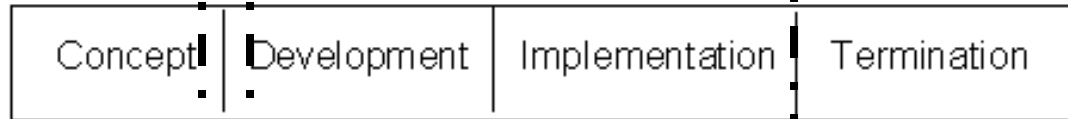


Sales process

Product Life Cycle



Project Life Cycle



Software process

Project planning

- Provides a framework for the project
 - Software scope
 - Resources
 - Expectations
- Make it possible to make reasonable estimates for
 - Resources
 - Schedules
 - Costs

Why a project plan?

- Forces the making of necessary decisions
 - Estimates, scheduling, budgeting
- Communicates decisions to other
- Checklist / action plan
- Who, what, when, why, where, how
- The "rules" of the project written in text, no misinterpretation

The project plan

- The very minimal project plan
 - Project objectives
 - Project deliverables
 - Project schedule
 - Supporting plans

Project objectives

I Stakeholders

- Name/contact information of stakeholders
 - Project manager(s)
 - Customer – the ones who receives deliverables
 - Supplier – the ones doing the work
 - Sponsors – paying for the thing
 - Other parties

II Objectives

- Objective I
- Objective II ...

Project deliverables

III Project deliverables

- List of things that the project has to deliver in order to meet the objectives
- Can be
 - System requirements
 - System design
 - Implementation
 - Installation
 - Documents

Schedule

IV Project schedule

- List of tasks/activities that has to be performed
- The name of person / role that is responsible for the activity
- Estimated times for tasks & activities
- Milestones
- Can use GANTT chart

PMUser

File Edit Move View Reports Tools Schedule Help

Manage Track View

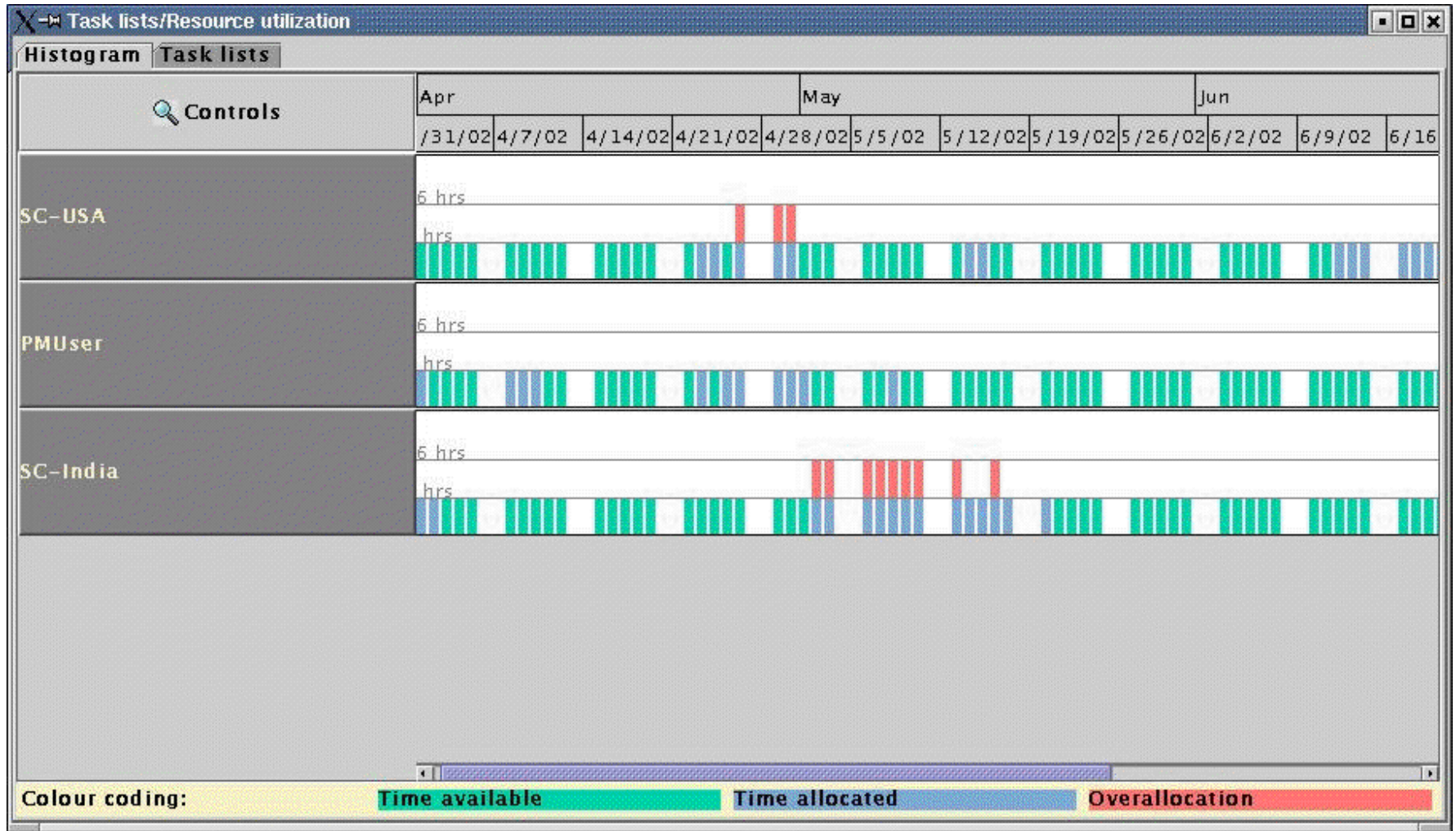
Search help:

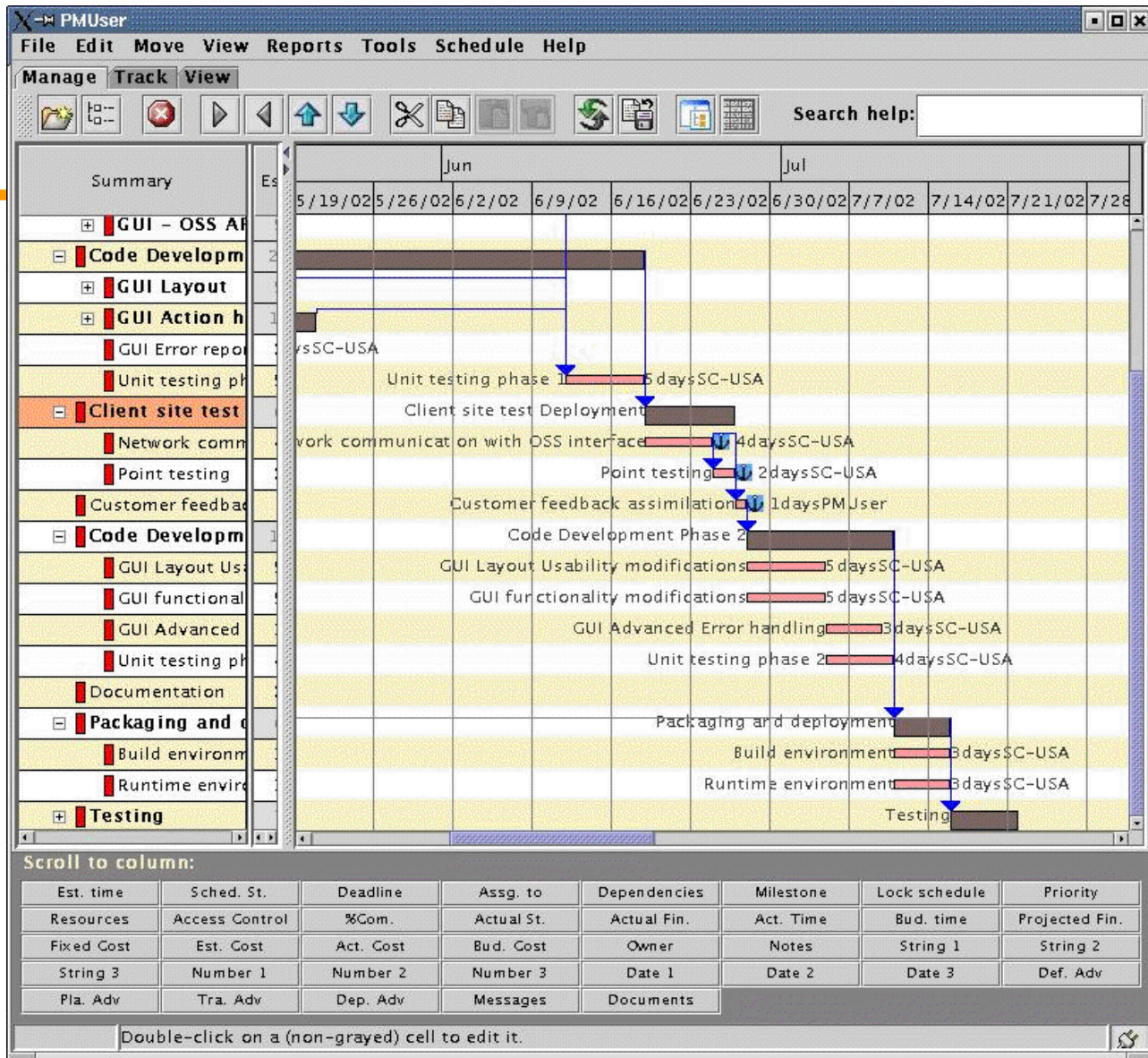
| Summary | Est. time | Sched. St. | Deadline | Assg. to | Depen |
|-----------------------------|-----------|----------------|----------------|----------|----------|
| Managed Projects | | | | | |
| OSS GUI Provisioning | 87days | 4/1/02 12:0... | 7/22/02 12:... | | |
| Customer Requirements | 6days | 4/1/02 12:0... | 4/26/02 12:... | | |
| System Design | 10days | 4/26/02 12:... | 5/2/02 12:0... | | Custom |
| Early risk elimination | 7days | 4/1/02 12:0... | 5/9/02 12:0... | | |
| OSS proxy | 2days | 4/1/02 12:0... | 4/3/02 12:0... | SC-India | |
| GUI - OSS API test | 5 days | 5/2/02 12:0... | 5/9/02 12:0... | | GUI int |
| Code Development Phase 1 | 25 days | 5/2/02 12:0... | 6/19/02 12:... | | System |
| GUI Layout | 5 days | 5/8/02 12:0... | 5/17/02 12:... | | |
| GUI Action handling | 13days | 5/2/02 12:0... | 5/21/02 12:... | | |
| Var/Tenant actions | 5 days | 5/2/02 12:0... | 5/9/02 12:0... | SC-India | |
| User actions | 2days | 5/9/02 12:0... | 5/13/02 12:... | SC-India | |
| Dial plan actions | 2days | 5/10/02 12:... | 5/14/02 12:... | SC-India | |
| Announcement server ac | 2days | 5/15/02 12:... | 5/17/02 12:... | SC-India | |
| Conference server action | 2days | 5/17/02 12:... | 5/21/02 12:... | SC-India | |
| GUI Error reporting | 2days | 5/14/02 12:... | 5/16/02 12:... | SC-USA | OSS p |
| Unit testing phase 1 | 5 days | 6/12/02 12:... | 6/19/02 12:... | SC-USA | Early ri |
| Client site test Deployment | 6days | 6/19/02 12:... | 6/27/02 12:... | | Code D |
| Network communication wit | 4days | 6/19/02 12:... | 6/25/02 12:... | SC-USA | |
| Point testing | 2days | 6/25/02 12:... | 6/27/02 12:... | SC-USA | Networl |

Scroll to column:

| Est. time | Sched. St. | Deadline | Assg. to | Dependencies | Milestone | Lock schedule | Priority |
|------------|----------------|-----------|------------|--------------|-----------|---------------|----------------|
| Resources | Access Control | %Com. | Actual St. | Actual Fin. | Act. Time | Bud. time | Projected Fin. |
| Fixed Cost | Est. Cost | Act. Cost | Bud. Cost | Owner | Notes | String 1 | String 2 |
| String 3 | Number 1 | Number 2 | Number 3 | Date 1 | Date 2 | Date 3 | Def. Adv |
| Pla. Adv | Tra. Adv | Dep. Adv | Messages | Documents | | | |

Double-click on a (non-grayed) cell to edit it.





Supporting plans

- V Roles & responsibilities
 - persons / organizations involved in the project and their role in the project
- VI Communication plan
 - To whom should what information be sent and when?
- VII Risks & risk management
 - List of risks
 - What action should be taken to minimize risk / counter-actions

Resources

- People
 - Necessary skills
 - Organizational
 - Technical
- Reusable software components
- Hardware / software tools

Risk analysis (i)

| Risk | Probability | Effects |
|--|--------------------|----------------|
| Organisational financial problems force reductions in the project budget. | Low | Catastrophic |
| It is impossible to recruit staff with the skills required for the project. | High | Catastrophic |
| Key staff are ill at critical times in the project. | Moderate | Serious |
| Software components that should be reused contain defects which limit their functionality. | Moderate | Serious |
| Changes to requirements that require major design rework are proposed. | Moderate | Serious |
| The organisation is restructured so that different management are responsible for the project. | High | Serious |

Risk analysis (ii)

| Risk | Probability | Effects |
|---|--------------------|----------------|
| The database used in the system cannot process as many transactions per second as expected. | Moderate | Serious |
| The time required to develop the software is underestimated. | High | Serious |
| CASE tools cannot be integrated. | High | Tolerable |
| Customers fail to understand the impact of requirements changes. | Moderate | Tolerable |
| Required training for staff is not available. | Moderate | Tolerable |
| The rate of defect repair is underestimated. | Moderate | Tolerable |
| The size of the software is underestimated. | High | Tolerable |
| The code generated by CASE tools is inefficient. | Moderate | Insignificant |

Risk management strategies (i)

| Risk | Strategy |
|-----------------------------------|---|
| Organisational financial problems | Prepare a briefing document for senior management showing how the project is making a very important contribution to the goals of the business. |
| Recruitment problems | Alert customer of potential difficulties and the possibility of delays, investigate buying-in components. |
| Staff illness | Reorganise team so that there is more overlap of work and people therefore understand each other's jobs. |
| Defective components | Replace potentially defective components with bought-in components of known reliability. |

Software scope

- Customer
 - Who is behind the request for this work?
 - Who will use the solution?
 - What will be the economic benefit of a successful solution?
 - Is there another source for the solution?
- The solution
 - When is the solution good?
 - What problems will this solution address?
 - Which environment

Project estimation

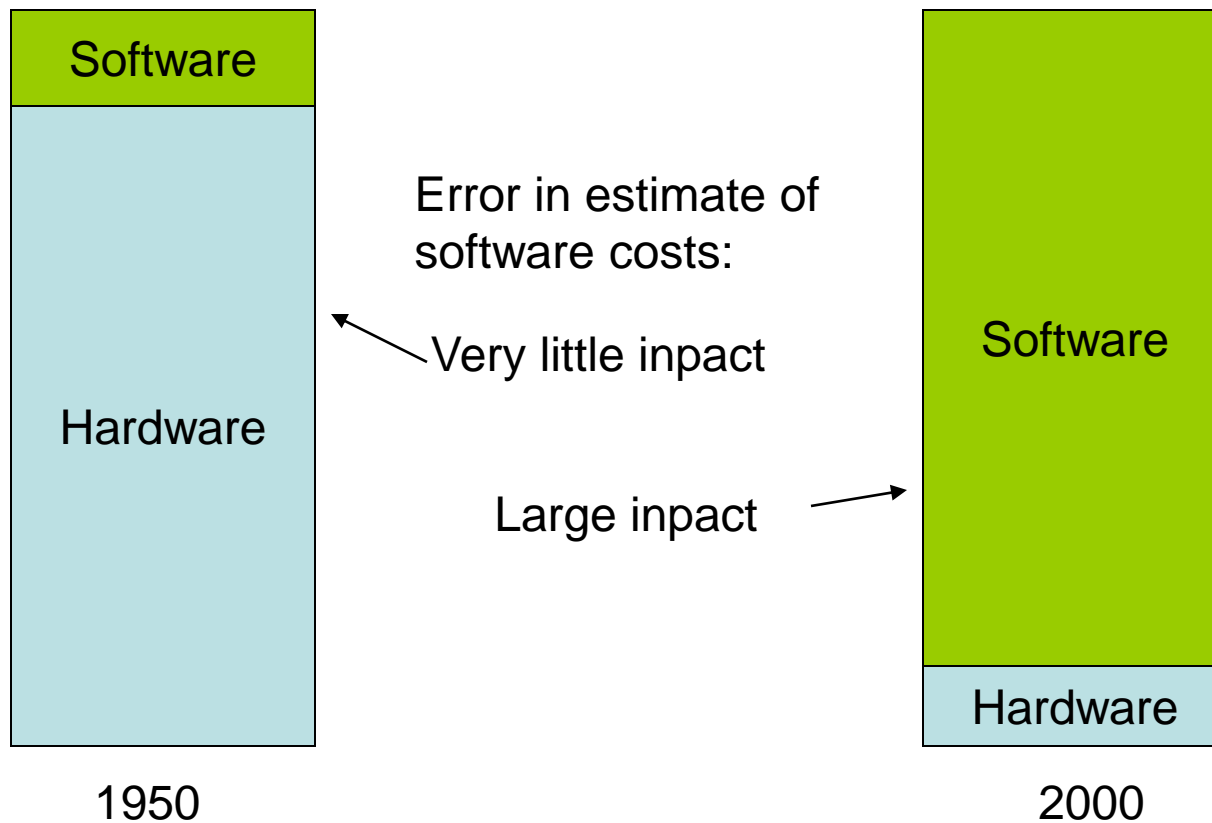
- Can you estimate the effort (man hours / money) needed to
 - clean your apartment?
 - prepare for an exam?
 - make a dinner?
 - build a house?
 - make a customization to an existing software?
 - make a movie reservation system?

Project estimation

- If your estimate is too small...
 - You´ll go bankrupt!! (you can´t afford to pay the salaries)
- If your estimate is too big...
 - You´ll go bankrupt!! (you´ll lose any competitive bidding)

Estimation historically

Computer system costs



Estimation...

- Well defined requirements
 - How to estimate if not known what to do?
- Historical data is of GREAT use
 - Software metrics for past projects
 - What worked, what caused problems?
- Update estimates during the project
 - Can refocus, remove requirements that cannot be finished on time
- Best case estimates, worst case estimates

Decomposition

- Software estimation is a form of problem solving
 - Large problems are divided into smaller problems and solved separately
 - Divide and conquer
- The software system is divided into smaller systems / tasks and estimated separately

Decomposition...

- Fine grained decomposition (e.g. very detailed tasks)
 - Errors in estimates will accumulate
 - Often estimating wrong in one direction...
- Coarse grained decomposition
 - Difficult to make fair estimated

Software sizing

- "Fuzzy "logic sizing
 - Identify type of problem, establish magnitude and scale it for this project
 - Historical data is essential
 - Experience
- Function point sizing
- Standard component sizing
 - Identify components needed and make a sum of efforts needed
- Change sizing
 - Used for existing software, how much changes are made?

Work estimation – “fuzzy”

- Two approaches
 - Systematic use of history data
 - Educated guess
- Three (usual) metrics
 - Number of function points
 - Amount of code lines
 - A metric based on subjective ad-hoc view

Function points vs (S)LOC

| Language | SLOC / function points (on average) |
|-----------------------------|-------------------------------------|
| Assembly | 320 |
| C | 128 |
| Cobol | 105 |
| Fortran | 105 |
| Pascal | 90 |
| Ada | 70 |
| C++ | 64 |
| Ada 95 | 53 |
| Visual Basic | 32 |
| Object languages | 30 |
| Smalltalk | 22 |
| 4. generation languages | 20 |
| Powerbuilder | 16 |
| Koodigenerators | 15 |
| SQL | 12 |
| Spread sheat programs | 6 |
| Graphical languages (icons) | 4 |

People and efforts

- Example:
 - 1 person 5000 LOC/year
 - 4 persons $4 * 5000 \text{ LOC} / \text{year} = 20000 \text{ LOC/year}$???
 - No, time needed for communication
 - corresponding to 250 LOC/year/communication path
 - $4 * 5000 - 6 * 250 \text{ LOC} = 18500 \text{ LOC/year}$

Make / buy issues

- More efficient to acquire than to develop??
 - Estimate internal cost to develop and the delivery date
 - Identify potential candidates
 - cost of acquisition + cost of customization < cost of developing
 - can we reuse the component?

Tools

- A lot of tools available, do the following
 - Sizing of project deliverables
 - Selecting project activities
 - Staffing levels
 - Predicting software effort
 - Predicting software costs
 - Predicting software schedules
- However: They are nothing but tools, the actual planning and estimation is done by you!

Management activities

- Proposal writing.
- Project planning and scheduling.
- Project costing.
- Project monitoring and reviews.
- Personnel selection and evaluation.
- Report writing and presentations.

Management commonalities

- These activities are not peculiar to software management.
- Many techniques of engineering project management are equally applicable to software project management.
- Technically complex engineering systems tend to suffer from the same problems as software systems.

How to manage time ?

- Project planning
- GANTT-charts (milestones, check-ups)
- Work effort estimation (very difficult....)
- Work distribution
- Stick to your plans (no extras....)
- Time reporting (essential for upcoming projects)
- How to avoid last-minute panic???

Project phases

- All projects are divided into phases
- All phases together are known as the project life cycle
- Each phase is marked by completion of Deliverables
- Identify the primary software project phases

Time tracking

Web TimeSheet

ProMax Admin Projects Timesheet Expense Journals Approvals Reports Config Logout Help

Doug Brown Sep 21, 2003 - Sep 27, 2003 **Total Billable Hours: 19.00**
 Timesheet Approver: Rob Jones Due Date: Sep 27, 2003

| Task | Billing | S 21 | M 22 | T 23 | W 24 | T 25 | F 26 | S 27 | Total | ETC (Hrs) |
|-------------------------------------|----------------|------|------|------|------|------|------|------|--------------|-----------|
| Administration | Non-Billable | | 8.00 | | | | | | 8.00 | |
| Web Site | Billable | | | | | | | | 0.00 | 40 |
| Graphics Engine / Maintenance | Java Developer | | | 3.00 | 8.00 | | 8.00 | | 19.00 | |
| Web Site / Deliverables / Revisions | Billable | | | | | | | | 0.00 | |
| Time Off | | S 21 | M 22 | T 23 | W 24 | T 25 | F 26 | S 27 | Total | |
| Sick (1 Day Taken) | | | | | | 8.00 | | | 8.00 | |
| Total | | 0.00 | 8.00 | 3.00 | | 8.00 | 8.00 | 0.00 | 35.00 | |

Buttons: Add / Remove Tasks (2), Add Time Off (1)

Utilization: Doug Brown (99%), Human Resources (92%)

Task Log: Graphics Engine / Maintenance: Sep 26, 2003 8.00 Graphics engine problems being resolved, was causing an unusual error

Buttons: Offline, Print, Copy From, Save, Cancel, Submit

Time tracking

ReportronicNET - Mozilla Firefox

File Edit View History Bookmarks Tools Help

abo.fi https://reportronic.abo.fi/ReportronicNET/frmMain.aspx?FORM= repotronic

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Explore IT: Silver Bullet S... Wenells projektmodell, f... Projekttankar ReportronicNET

REPORTRONIC

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Person **jbjorkqv**

Week 38 Year 2010 Search

Previous Next

Time period 20.09.2010 - 26.09.2010

Project selection 99 Allmän förvaltning/General administration Add

| | September | Actual | Sum | Mon 20.9. | Tue 21.9. | Wed 22.9. | Thu 23.9. | Fri 24.9. | Sat 25.9. | Sun 26.9. |
|-------------------------------|-----------|--------------|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 280004881 RECOMP | 16,34% | 0 | | | | | | | | |
| 280006361 Tekes CLEEN-Kost | 15,36% | 7,25 | 7,25 | | | | | | | |
| 280006531 Tekes Engines-Ko | 34,64% | 0 | | | | | | | | |
| 99 - 9901 Undervisning | 33,66% | 22,5 | | 0,75 | 7,25 | 7,25 | 7,25 | | | |
| 999 Semester/Holiday | 0% | 0 | | | | | | | | |
| 999 Sjukledighet/Sic | 0% | 0 | | | | | | | | |
| Sum | | 29,75 | | 7,25 | 0,75 | 7,25 | 7,25 | 7,25 | 0 | 0 |

Total duration 29,75 hours [Make new worktime announcement](#)

Find: dataint Next Previous Highlight all Match case

Done

Time management tools

- Microsoft project
- Other tools

Picking a team leader

- One person from each group should be selected as team leader / project manager
- Tasks
 - Communicate with customer
 - Arranges team meetings
 - Is responsible for the project plan
 - Is responsible for dead-lines
- **TEAM MUST AGREE – the team leader IS THE BOSS!!**

Key points

- Good project management is essential for project success.
- The intangible nature of software causes problems for management.
- Managers have diverse roles but their most significant activities are planning, estimating and scheduling.
- Planning and estimating are iterative processes which continue throughout the course of a project.

Finally

- My personal favorite methodology:

Keep

It

Simple

Stupid!

- Break down the big picture to simple sub problems
- Solve the simple problems with simple methods
- Look on the essentials
 - What are we trying to do
 - What will be done, by when?
 - Who is responsible for a function?
 - How will the job be done
 - What resource do wh need