Exercises

• **7 exercises** (E1, E2, E3, E4, E5, E7, and E8)
  
  – Released on the **23.April**
    • Check the course website!
  
  – Solutions submitted by the **30.April** (firm!)
    • Email your solutions to [rma@ut.ee](mailto:rma@ut.ee)
    • Subject: [Proj. Mng.] E1-8

To change (**increase/decrease**) the exercise score

solutions to **ALL** seven exercises **MUST** be submitted
Exercise 1
Exercise 1

• A **product breakdown structure** for the *Decision support system* needed to produce the *Implementation specification*

• **TASK:** Based on the Product Breakdown Structure draw a possible **Product Flow Diagram**
Exercise 2
Exercise 2

**TASK:** Using the activity durations given in the table, calculate the *earliest completion date* for this project and identify the *critical path(s)* on the network.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Estimated duration (days)</th>
<th>Activity</th>
<th>Estimated duration (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify overall system</td>
<td>10</td>
<td>Design module A</td>
<td>15</td>
</tr>
<tr>
<td>Specify module A</td>
<td>4</td>
<td>Design module B</td>
<td>17</td>
</tr>
<tr>
<td>Specify module B</td>
<td>7</td>
<td>Design module C</td>
<td>10</td>
</tr>
<tr>
<td>Specify module C</td>
<td>3</td>
<td>Design module D</td>
<td>13</td>
</tr>
<tr>
<td>Specify module D</td>
<td>5</td>
<td>Code modules A&amp;C</td>
<td>25</td>
</tr>
<tr>
<td>Check A&amp;B specifications</td>
<td>12</td>
<td>Code modules B&amp;D</td>
<td>22</td>
</tr>
<tr>
<td>Check C&amp;D specifications</td>
<td>9</td>
<td>Integrate/test system</td>
<td>3</td>
</tr>
</tbody>
</table>
Exercise 3
Exercise 3

• **Situation 1:**
  – A finance director needs to ensure that a software application is changed to conform with new legal requirements.

• **Situation 2:**
  – A system analyst needs clarification of what is meant by a particular term used in a banking domain.

• **Situation 3:**
  – The novice bank clerk does not understand how he needs to perform the financial transaction using the online banking system.

**TASK:** Describe what would be the best *mode of communication* for these three situations.
Exercise 4
Exercise 4

- A new project has *average* novelty for the software supplier that is going to execute it and thus given a *low* rating on this account for precededness (PREC). Development flexibility (FLEX) is *high*, but requirements may change radically and so the risk resolution exponent (RESL) is rated *very low*. The development team is all located in the same office and this leads to team cohesion (TEAM) being rated as *very high*. But the software house as a whole tends to be very informal in its standards and the procedures and the process maturity driver (PMAT) has therefore been given a rating of *low*.

- **TASK:**
  - Calculate the *scale factor* (*sf*) in this case
  - Estimate the overall *effort* if the size of the application is estimated as 2000 lines of code
Exercise 5
Exercise 5
Application of PERT

<table>
<thead>
<tr>
<th>Activity</th>
<th>Optimistic time ((a))</th>
<th>Most likely time ((m))</th>
<th>Pessimistic time ((b))</th>
<th>Expected time ((t))</th>
<th>Standard deviation ((s))</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4 (weeks)</td>
<td>5 (weeks)</td>
<td>7 (weeks)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>6</td>
<td>9</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
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</tbody>
</table>

**T1:** Calculate *the expected duration* and *standard deviation* for each *activity*

**T2:** Identify *the critical path*

**T3:** Calculate the *standard deviation* for each project *event* (node)
**Exercise 5**

**Application of PERT**

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**T4:** Calculate \(z\) values for each node that has a target date

**T5:** Convert \(z\) values to probabilities

- What is a probability to complete activity E by week 11?
- What is a probability to complete the project within 16 weeks?
Exercise 7
### Exercise 7

**Resources to run this project:**
- One analyst
- Three designers available until the end of week 11
- Three developers available after week 11 and only two developers available after week 13

**TASK:** What is the impact of resource assignment to the activity network
- What are the critical activities and critical paths after the resource allocation?
Exercise 7

- Draw the resource histogram assuming that every activity starts as early as possible
- Smooth the histogram taking into account the available resources
- Draw the new activity network according to smoothed histogram
  - Identify critical activities
  - Identify critical paths
Exercise 8
Exercise 8

• **Usability quality**
  - **Q1**: The system could have only few major problems
  - **Q2**: Majority of users shall find system easy to learn (easiness was precisely defined before asking the users)

• **Performance quality**
  - **Q3**: When switching to the next screen tying must be possible after very short delay. It should take short time to showing simple report screens.
  - **Q4**: In standard workload, the task should be performed quickly.

• **Security quality**
  - **Q5**: information losses should be very small during long period.

**TASK**: Define fit criteria for each of these qualities