Case Study – Cost Estimation with COCOMO

Form a team of 2 to 4 students.

You are about to develop an app that analyses data from software repos and makes predictions about the technical debt contained in the next release.

You created a system specification and made Function Point estimate resulting in 500 unadjusted Function Points.

The system shall be implemented in Java.

You make the following assumptions about the organizational and project context:
- Your development organization/team has a thorough understanding of the product objectives and much experience in working with similar systems. There is neither a need for concurrent hardware development nor a need for developing new/innovative data processing algorithms. (PREC = Extra High)
- There is no (or little) need for conformance with pre-established requirements and external interface specifications. You use the ‘no rush’ rule in your development teams. (FLEX = Extra High)
- Your Architecture/Risk resolution is average with few (2-4) critical risk items (RESL = Nominal)
- All involved stakeholders share a common vision of the product to be developed as well as a common communication and cooperation culture. There exists a well-established trust relationship among all stakeholders. (TEAM = Extra High)
- Your organization has a maturity corresponding to a CMMI level of 3. (PMAT = High)

You make the following assumptions about the product to be developed:
- If the predictions produced by the app are repeatedly inaccurate, this could imply a major financial loss. (RELY = High)
- There is no or very little need for code reuse of the app to be developed (RUSE = Low)

You make the following assumptions about the available personnel:
- Your analyst and your programmers in the team have top design and programming ability, work efficiently and thoroughly, and have the ability to communicate and cooperate well with all team members. (ACAP = Very High, PCAP = Very High)
- The team members have experience with programming in Java for at least three years. The same applies to the experience with the development platform and tools. (APEX = High, PLEX = High, LTEX = High)

You make the following assumptions about the project constraints:
Your team is distributed over offices in Tallinn and Tartu but has all kinds of high-speed, multi-media communication tools available. (SITE = average of Nominal and Extra High → could be High or Very High)

The schedule should be optimal with regards to effort consumption. (SCED = Nominal)

To Do:

1. How much effort will the system consume (not including maintenance in your estimate)?
2. How much will the system cost, if you assume a monthly salary of 3000 US $ per developer?
3. How will the effort and time estimates change, if you try to make the project as short as possible (i.e., you try to compress the project schedule as much as possible)?

Hints:
- Use the COCOMO Manual and Tool available on the course wiki.
- If you cannot identify information regarding a specific Scale Factor or Effort Multiplier (Cost Factor), assume that it has the value “Nominal”

Answers:

Ad 1:
size_type, Function Points
function_points, 500
language, Java
prec, Extra_High
flex, Extra_High
rely, High
data, Nominal
cplx, Nominal
ruse, Low
docu, Nominal
resl, Nominal
team, Extra_High
acap, Very_High
pcap, Very_High
pcon, Nominal
apex, High
pexp, High
ltx, High
pmat, High
time, Nominal
stor, Nominal
pvol, Nominal
tool, Nominal
site, Very_High
sced, Nominal
software_maintenance, Off
software_labor_cost_per_PM, 3000
submit2, Calculate
software_effort, 26.9 person-months
software_schedule, 10.9 months

Ad 2:

Cost = $80747

Ad 3:

Set SCED = Very Low

->
Effort = 38.5 Person-months
Schedule = 8.2 Months
Cost = $115468