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Softwaretechnik/Software Engineering

https://swt.informatik.uni-freiburg.de/teaching/SS2024/swtvl

Exercise Sheet 3

Submission: Wednesday, 08-05-2024, 15:59

Exercise 1 – Process Model Application (8/13 + 5 Bonus)

Assume you are the manager of a company that develops radio communication technology for fire alarms. Your company is hired by an external client to develop the software of a new radio module for fire detectors. Once developed, the module needs to be certified to comply with its corresponding industry standard, and you are also required to provide technical documentation.

1.1) Consider the activities in Figure 1 (together with their respective artifacts and responsibilities). Those are the established activities in your company.

Provide a *graphical process model* for delivering a finished radio module by using those building blocks. (5)

1.2) Your company has the following staff available, with their corresponding qualifications for roles:

- Alex: Requirements analyst, Test manager
- Mia: Product manager
- Chris: Certification manager, Technical writer
- Robin: Software developer, Software tester, System tester

All of them have full-time availability (1 PM per calender month), except for Chris, who works only part-time (0.5 PM per month).

Consider the effort estimates indicated in Figure 1 and analyze the expected total effort of the project and its expected minimum duration in months by assigning the staff to each of the roles required and considering their availability. The project is supposed to start on 2024-06-01.

Present your analysis using a *Gantt chart*[1]. (2)

1.3) To validate the process model from Task 1.1, that is, to check whether actual processes are sufficiently well represented in the model, we can try to match it against (phases of) actual processes.

For this task, assume that it is not uncommon in this company that, four weeks into developing the software module, the QA identifies issues and raises them as part of QA results. It usually takes the developer(s) 2 days to analyse the issue and fix it, and it takes QA people another day to confirm that the issue is no longer observable.

Discuss how and in how far your process model from Task 1.1 matches the assumed process scenario. (1)

1.4) Now assume that your customer is experiencing delays due to understaffing. The customer wants to extend your contract to also develop the software for the sensor module of the fire detectors. Your company would still be responsible for quality assurance, certification, and documentation.

At the same time, an *intern* with the same capabilities as Robin but with only part-time availability (0.5 PM per month) has joined your company and can be considered in addition to the staff named in Task (1.2).

[1] See https://en.wikipedia.org/wiki/Gantt_chart.

(a) Extend your graphical process model from Task (1.1) to include the development of the new module. Clearly indicate which parts you have added. (3 Bonus)

(b) Analyze the expected total effort and the minimum duration of the expanded project with the given staff including the intern. (2 Bonus)

Exercise 2 – Creating Process Models (5/13)

Working on software engineering tasks is an activity and the creation of each solution to a software engineering task does have a process. So it should be possible to model these processes.

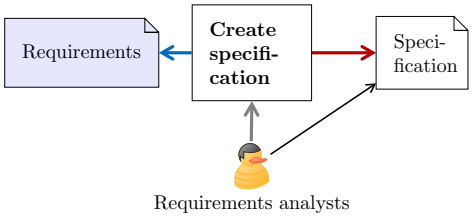
2.1) Create a process model of the way of working that is employed by your team between the issue of an exercise sheet of this course and your final submission (or make up a plausible way of working, if you do not want to disclose the one that your team actually follows). Use the basic process model building blocks (activity, role, etc.) and briefly describe the activity, role, etc. that they represent. (2)

2.2) If a team is looking for a way of working that promises that every team member gets about the same learning effect, would you recommend the approach that you have modeled in Task (2.1)?

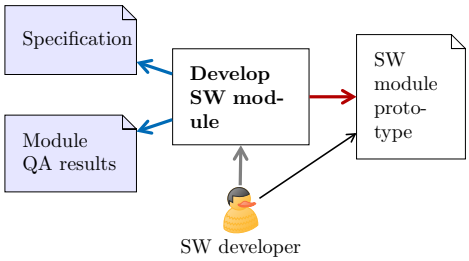
Why (not)? Discuss advantages and disadvantages on the basis of the process model. (1)

2.3) As your team is handing in a single solution, both of you have to agree upon the solution, the 'completedness' of the solution and the exercise that you want to receive feedback on. Does the process described by you in Task (2.1) reflect this? Justify your answer.

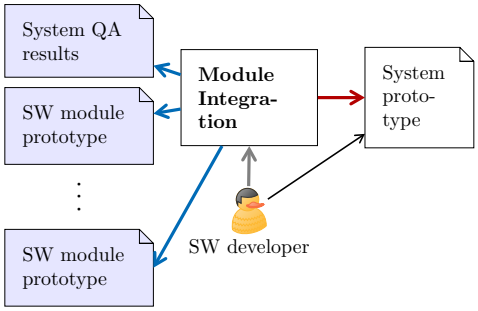
In case your process does not reflect these decisions, how can you extend it to decide if and when an exercise is finished? Provide the extended process model. (2)



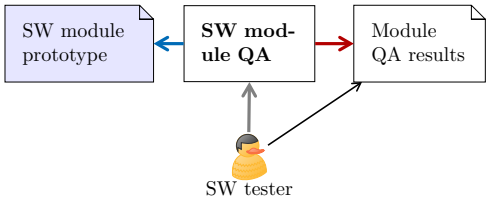
(a) Create specification. (0.5 PM)



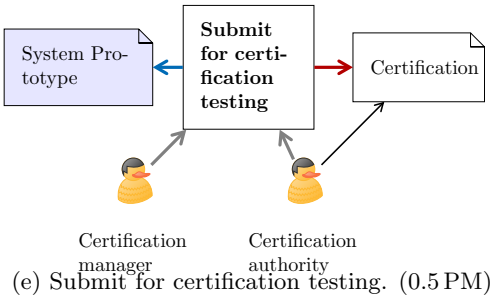
(b) Develop software module. (1.5 PM)



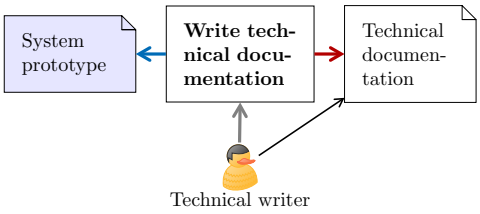
(c) Module integration. (0.5 PM per module)



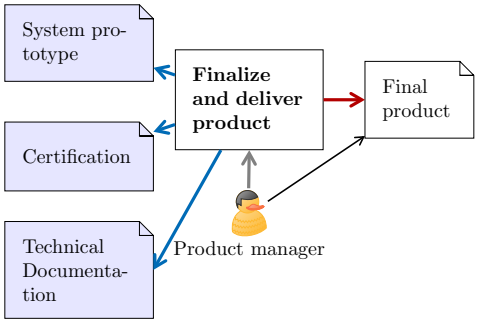
(d) Software module quality assurance. (0.5 PM)



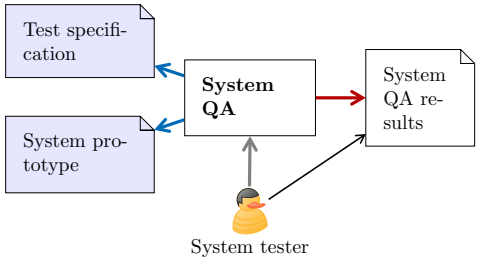
(e) Submit for certification testing. (0.5 PM)



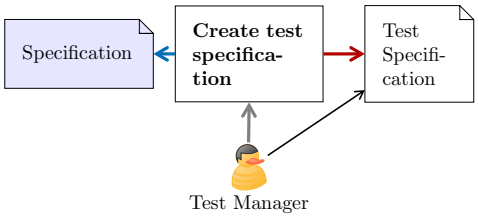
(f) Write technical documentation. (0.5 PM)



(g) Finalize and deliver product. (0.75 PM)



(h) System quality assurance. (0.5 PM)



(i) Create test specification. (0.25 PM)

Figure 1: Activities, artefacts, and responsibilities of your company.