Problem Sheet 2. Model selection for software development

Your goal for the practical is to select an appropriate process model for a particular case scenario. When performing that, think about the problem in terms of its novelty to the world (e.g., try to understand whether this is a well-known problem or a completely new one) and to your company, analyze the availability of information on user needs; try evaluating your experience in the area, expected project risks, the need for incremental deployment, expectations from customer management and their willingness to collaborate, and other involved factors.

Problem 1. Briefly explain what risks or risk classes are *highly* likely to occur to the following projects. Use the provided Risk Assessment Sample Checklist if you like.

1) The Federal Aviation Administration (FAA) wants you to rewrite the U.S. air traffic control system.
2) A small sports supply store wants you to write some sales software, but the two partners can't agree on exactly what it should do.
3) Your customer wants you and your team of five fearless developers to write a word processing application as powerful as Microsoft Word in the next three months. (At double your normal rates!)
4) A real estate developer wants to build an application that helps design large housing developments. (Your team just finished building a vacation costing application.)
5) Your customer dumped a 10-page software specification on your desk and then left on a 3-week vacation.
6) Your customer wants to build a 3-D printing application that lets you make buildings out of concrete. (Really, search the Internet for "3-D printer castle Andrey Rudenko" to see what one bored contractor did with this idea in his spare time.)

Problem 2. Indicate which of the following tasks would be better handled predictively or adaptively and briefly say why.

1) Manufacturing parts of cars
2) Building a pedestrian bridge over a river
3) Following a series of clues in a scavenger hunt (aka a quest)
4) Making a scavenger hunt (aka a quest) for others to follow
5) Planning a picnic
6) Planning a picnic in Saint Petersburg
7) Planning a major motion picture
8) Teaching an introductory programming course
9) Finding a specific restaurant while visiting an unfamiliar city before 1990
10) Finding a specific restaurant while visiting an unfamiliar city with a GPS
11) Finding a specific restaurant while visiting an unfamiliar city in a few years when cars drive themselves and are plugged into a smart street network

Problem 3. Briefly explain why each of the following projects might be risky if approached with a predictive process model.

1) The Federal Aviation Administration (FAA) wants you to rewrite the U.S. air traffic control system.
2) A small sports supply store wants you to write some sales software, but the two partners can't agree on exactly what it should do.
3) Your customer wants you and your team of five fearless developers to write a word processing application as powerful as Microsoft Word in the next three months. (At double your normal rates!)
4) A real estate developer wants to build an application that helps design large housing developments. (Your team just finished building a vacation costing application.)
5) Your customer dumped a 10-page software specification on your desk and then left on a 3-week vacation.
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Problem 4. Under what circumstances would a predictive model cost less in time and effort than an adaptive model? Under what circumstances would it cost more?

Problem 5. Suppose your customer wants an application with 10 features and insists that the application is completely useless unless all 10 are implemented with full fidelity. Would there be any benefit to iterative, incremental, or agile approaches?

Problem 6. Look at the Unified Process scheme. Why might the deployment tasks start during the elaboration phase instead of at the beginning of the transition phase? What deployment tasks might you be performing during elaboration? What tasks might you be performing during construction?

Problem 7. Look at the Unified Process scheme. The testing tasks begin in the inception phase before the implementation tasks start. What are you testing during inception if there isn't any code yet?

Problem 8. Look at the project shown in Figure 13-6. What kinds of code are the team members writing during the elaboration phase? What kinds of tests are they performing during that phase?

Problem 9. Suppose you're a real estate developer building a neighborhood containing 100 houses. How would each of the predictive, iterative, incremental, and agile approaches correspond to home sales? Assume the "features" of the project are the houses and "releasing

a feature" means allowing people to move into a home. Which of the approaches could work? Which approach do developers actually use?

Problem 10. Your company is a leader in providing solutions related to installation of software systems for human resources (HR). Your company is being contracted by a medium-size retailer to provide this solution. Which process model is suitable for this use-case?

Problem 11. A very large distributed hospital wants to automate their processes across its divisions (think automatic accounting for acquiring medications, patient health records, etc.) and has hired your company that has substantial expertise in similar automation projects, except not at this scale. The hospitals' management is unsure about nuances that may arise during such an automation. A few hospital divisions will benefit from immediate automation. Which process model is suitable for this use-case?

Problem 12. The defence agency wants to build a novel capability to keep the country protected from potential conflicts. The system has never been attempted, including nearly zero literature existing on the topic. The system is expected to be significantly big and complex, taking decades to build. The agency and your company both have only vague ideas about the possible solutions. A huge number of stakeholders get involved in building the system. Which process model is suitable for this use-case?