TUDelft

SPM 4110 – Designing Multi-Actor Systems
Exam

Faculty of Technology, Policy and Management
Delft University of Technology
November 8, 2013

Important Rules & Notes:

- The use of all course material on paper (lecture notes, personal notes, lecture slides, books) is allowed including a dictionary, if needed.
- Any communication device is forbidden to use and should be turned off and out of sight.
- Be concise and sharp in your answers; the insight into the material and line of reasoning is most important. Lengthy answers can also work against you. So, avoid excessive writing in the hope of hitting the right answer or confusing your instructor. Your answers should be relevant and up to point.
- Reference to course material in your answers is allowed and can even support your argument, but always requires your concise rephrasing or summary (so not only "See page 20 in J. Doe, 2000" as your answer). Your answers should be self-contained.
- Answers have to be in good English.
- Answers for each question should start on a new exam page.
- Answers should be expressed in your own words not exact copy from the sources.
- Use a black and/or blue pen for your answers.
- The exam will be corrected within the official TU Delft correction period.
- You can get 100 points in total. Handing in a page with your name is worth 10 points. The remaining 90 points are divided among the 6 questions as per below.
- Disregarding the above rules/points may result in -5 points (subtracted from total points).

Question 1. System synthesis and collaboration support (14 points)

   a) Why is collaboration support important for the design of a multi actor system? (4 points)
   b) What are design challenges for the collaborative design of a multi-actor system? (4 points)
   c) Answer the following question in relation to the case study in which you participated. Briefly describe your case study (3-5 sentences) and describe how you can use a "Change of Perspective" to support the system synthesis phase in the design of your multi-actor system? (6 points)

Question 2. Exploratory modeling (15 points)

Imagine that you have been hired by the port of Rotterdam as a consultant. The problem Rotterdam is currently facing is the following: they are building the second Maasvlakte which was founded on the believe that container shipping would grow drastically, but it appears this believe is ill-founded. Moreover, the Chinese are investing in terminals in the Mediterranean. You have a model that estimates worldwide container flows given information on origin-destination demands for container shipping. This OD demand is specified at a country level. The model uses information about costs for shipping goods from a given destination via various ports to a given destination. Questions that the port would like to see answered include among others:

- What are the major vulnerabilities for container shipping in Rotterdam?
- Will the Mediterranean ports become serious competitors for Rotterdam, and when?
- Which ports in Europe are the major competitors for Rotterdam with respect to container shipping?

Explain how and in what way exploratory modeling could be used to address these types of questions.

Question 3. Decision Making (16 points)

Johan Hogson has a speciality shop in antiquities. For the upcoming season he needs to decide on how much stock he will buy (small, average, large). The number of antiquities sold will be largely dependent on number (low, medium or high) of tourists visiting the city.
The following table summarises the payoffs Johan expects to receive for each scenario:

Size of stock	Amount of tourists in the city		
	low	medium	high
small	4	4	4
average	6	8	8
large	3	7	10

Johan expects the probabilities of low, medium and high numbers of tourist as 0.25, 0.6, and 0.15, respectively.

Answer and add an explanation to your answer for the following questions
 a) What decision should be made using the Laplace criterion? (4 points)
 b) What decision should be made using the optimist criterion? (4 points)
 c) What decision should be made using the min-max regret criterion? (4 points)
 d) What decision should be made using the maximization of expected utility? (4 points)

Question 4. Planning for action (15 points)

In our lecture on "Planning for Action" we addressed more operational techniques for planning, and more strategic techniques for planning. Among the strategic techniques we discussed, there is the assumption-based planning perspective. Read the following short abstract from Wikipedia. The abstract concerns a European governance body which is concerned with digital goods and services.

Directorate General for Communications Networks, Content and Technology[1] or "DG CONNECT" is a Directorate-General of the European Commission. DG CONNECT helps to harness the development and use of Information and communication technologies (ICTs) in order to create jobs and generate economic growth; to provide better goods and services for all; and to build on the greater empowerment which digital technologies can bring in order to create a better world, now and for future generations. The DG's role is to

- Support the kind of high-quality research & innovation which delivers imaginative, practical and value-enhancing results.
- Foster creativity through a European data value-chain in which anyone can share knowledge.
- Promote greater use of, and public access to, digital goods and digital services, including "cloud" computing, in order to boost the European single market.
- Ensure that those goods and services are more secure, that people can trust the rapidly evolving technologies which surround them, and that people have the right skills and confidence to use them as part of everyday life.
- Work with partners globally to support an open Internet.

Wikipedia, "Directorate General for Communications Networks, Content and Technology"

Using the material provided and your lecture notes, answer the following:
  a) Identify one assumption embodied in the mission statement of the DG Connect. (3 points)
  b) Using the assumption identified, acknowledge a potential vulnerability. (3 points)
  c) Using the assumption you identified, define a signpost which could indicate that this assumption is now vulnerable. (3 points)
  d) What is the difference between a hedging and a shaping action? (3 points)
  e) Define either a hedging or a shaping action for the vulnerability you have identified. (3 points)

Question 5. Process management – Case harbor (20 points)

Consider you are the architect of a decision making process about a considerable expansion of a harbor in the Netherlands. You work for the Dutch Minister of Transport and Waterworks who is very keen to decide on this harbor within two years, for then new elections will take place. You know that there have been talks about this harbor for twenty years now, without results. It seems hard to commit local governments, provinces and residents and infrastructure managers to this project, but shipping companies and supporting industries are cooperative. Most residents are not convinced of the need of the expansion. Central government and the regional industry see the expansion as vital to the Dutch economy and also point at potential local benefits for employment. Further returning issues are environmental impact (pollution, harm to ecological structures) and discomfort of residents (pollution, sight). Some scientists claim that the pollution issues wouldn't be serious if innovative technology is implemented. Other scientists doubt these claims and are concerned about the maturity of the technology.

You consider hiring an independent research bureau that once-and-for-all assesses the several impacts of the harbor expansion, resulting in an advice. You advice the Minister to respect this advice and decide accordingly.

  a) Name two risks of this strategy. Explain why these risks do exist in a network context. Refer explicitly to one of the lectures about process management. (6 points)

b) Provide two process rules that make this strategy effective in networks. Explain why these process rules are effective. (6 points)
c) Provide per process rule as mentioned under b) a disadvantage (or a risk) and another process rule to overcome it. (8 points)

Question 6. Process management – already desired solutions (10 points)

One of the risks of process management is that it seduces managers to explain already desired solutions rather than negotiate them.

a) Why is this a risk? Provide two answers. (5 points)
b) Provide a process rule that avoids this risk. (5 points)