CS-E5360 Systems of Systems

Examination May 31, 2019

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No written material is allowed in this exam. Calculators are not allowed. Submit at least one answer sheet, even if an empty one! Write on each answer sheet you submit the code of the course, the date, your name, and your student ID number.

1 (20 points)

Provide a description of the following concepts:

1. What does the concept "*chicken-egg*" problem mean in the context of digital platforms?
2. What does "*Context Awareness*" signify in an Internet of Things / Systems of Systems context?

2 (20 points)

Explain what is meant by *Northbound* communication versus *Southbound* communication in an IoT(/SoS) system. Give at least 4 examples of interoperability/communication standards and explain whether they are rather targeted towards Northbound or Southbound communication. Would you consider O-MI and O-DF to be more suitable for Northbound or Southbound communication? Also justify your answer regarding O-MI and O-DF.

3 (20 points)

What is a *Microservice Architecture*? When and why is a Microservice Architecture a good choice? Is the O-MI / O-DF Reference Implementation of Aalto University using a Microservice Architecture? Also explain why it is or why it is not a Microservice Architecture.

4 (20 points)

Describe how Tiwana defines a *software platform*, as well as a *software platform ecosystem*. Tiwana also has a section on "what a platform is not" that is useful for answering this question.

In your opinion, is the *World Wide Web* a software platform according to that definition? Why or why not?

5 (20 points)

Describe three different examples of Systems of Systems use cases in the context of Smart Cities. For every use case, explain:

- Why they are Systems of Systems?
- How many different organizations/products/information systems are involved? Which ones?
- How would those different organizations/products/information systems interoperate as a "business ecosystem"?
- What are the main security and safety requirements and challenges in those systems?

Good Luck!