



# HjemmeEksamen

**Emnekode:** MPSE-2201

**Emnenavn:** System Design & Engineering

**Dag og dato:** Torsdag 30. April til Fredag 29. mai 2020

**Antall oppgaver:** 4

**Antall sider:** 3

**Vedlegg:** Ingen

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For all the following questions, please first discuss briefly your understanding of the terms in the context of systems engineering and design (using literature) and then support your discussion by using examples/Models from your system design case.

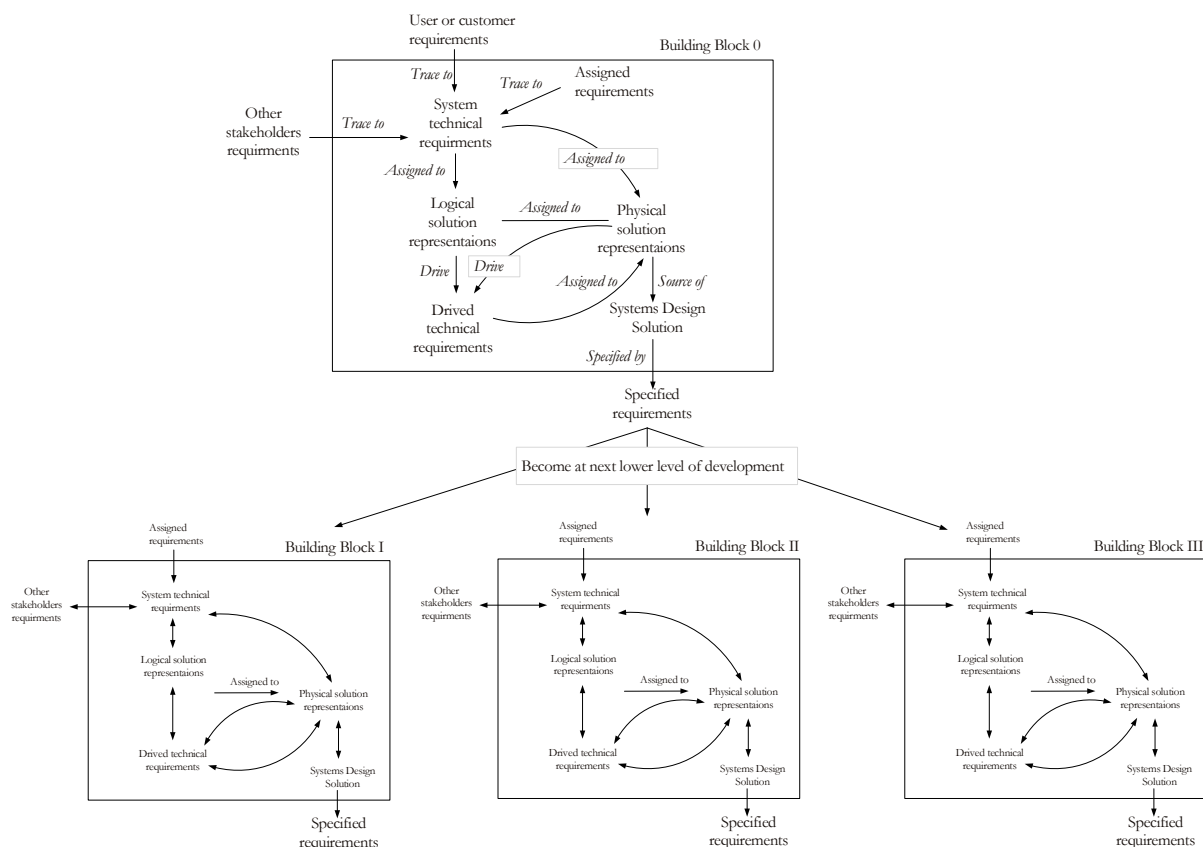
Remember that this is an **INDIVIDUAL** reflection. If you think that group's models and diagrams are inadequate, please make your own appropriate changes in the way **YOU** think is correct.

### Question 1 [20 Marks]

In his book, "Systems Design and Engineering: Facilitating Multidisciplinary Development Projects", Bonnema recommended some thinking pattern/tracks for systems engineers to follow (chapter III). Discuss your understanding for at least 3 of those terms and how following those thinking tracks proved to be helpful/or not for your team in handling the complexity of development efforts of your system?

### Question 2 [40 Marks]

The figure below shows allocation process by which requirements ("resources" and other) defined at one level (system, segment, element, etc.) are assigned to the parts of the logical and physical architecture at the next lower level (segment, element, subsystem, etc.)



- a) Discuss briefly backward and forward traceability in requirement management and how did your team guarantee a clear traceability threads throughout your system development process.
- b) Choose one stakeholder's requirement (functional or non-functional) of your case. Trace this requirement "top down" from identifying customer requirements through your development phases to finally implement this requirement into physical and technology solution.
- c) Partitioning the system into building blocks as shown in the figure poses challenges both on the internal and external interfaces. Discuss briefly, why internal interfaces between subsystems and external interfaces to other external systems are important for systems engineer to consider. How did your group identify and manage some of these interfaces?
- d) System can have three architectural views, Functional, Operational, and Physical architecture. Explain briefly each view and discuss the relationship between the three views. Support your answer with examples of your system engineering case.

### **Question 3 [20 Marks]**

- a) Discuss the terms Integration, Verification and Validation (IV&V). Describe briefly the types of activities that are directed at each development phase to guarantee adequate implementation of (IV&V). Please support your answer by using examples from your system engineering case.
- b) Discuss some of the major technical risks (2 to 3 risks) associated with developing your system. Explain how you will go about guaranteeing a sufficient verification and validation of at least 3 requirements/specifications of your system.

### **Question 4 [20 Marks]**

What is the value proposition and benefits that your system solution offers, e.g. the value for you customer?

What is the business proposition, e.g. the value for your company designing and hopefully producing your system?

What are the key performance parameters of your system (at least 3)?

How do these key performance parameters relate to the value and the business proposition?

What are some of the challenges that might hinder your design team from achieving value and business proposition?

**Enjoy and Good Luck**