# SysEng 6104 Project Task II

# Inputs for Architecture Generation

1. Based on lectures on last two lectures  and your reading assignment and SEBoK v1.9.1 define the following terms with 20-30 words:
    a. Architecture – an abstract description of the entities of a system and the relationship between those entities
    b. Architecting Process – bringing form to function, bringing order out of apparent chaos, converting partially formed ideas of a client into a workable conceptual model
    c. Architect – work with systems to structure and lead the early, conceptual phases of the system development process, and to support the process throughout its development, deployment, operation, and evolution
    d. Architecture Generation – produces actual developments in the systems process from abstract, conceptual ideas
    e. Architecture Representation – defines in an accurate way an architecture's spatial dimensions in the absence of tangible renderings

2. Based on your answer to question 2.e in Project Task I review the key performance attributes that you have provided and come up with five important key performance attributes for the system that you have selected for Project task I and define each of them with 20-30 words.

    a. Material Availability – measures total inventory of a system ready to perform an assigned mission at any time and is based on the condition of the materials. Number of different ways companies measure. One example is the number of products with deviations compared to the total number of products produced
    b. Operational Availability – measures time that a system or group of systems within a unit are capable of performing a mission assigned. Can be measured in uptime/total time
    c. Reliability – how often the system can function at its operational capacity without needing maintenance. Can be measured in Mean Time Between Failures or Mean Time Between Maintenance
    d. Total Ownership Cost – program's life-cycle cost that includes related infrastructure or business processes costs not necessarily attributed to the program in the context of the defense acquisition system. Measured in USD
    e. Documentation – describes handling, functionality, and architecture of a technical product or a product under development or use. Can be measured in number of man hours.

3. Provide an upper and lower bound for each key performance attribute selected with description of 20-30 words for each bound and possible way to measure it.

    a. Upper Bound of Material Availability: The upper bound of material availability would be manufacturing no parts with defects. For a relatively simple prototype or CAD it wouldn't be unreasonable to have 100%, or no deviations in any of the materials after manufacturing.
    Lower Bound of Material Availability: The lower bound of material availability could be based on ordering all parts of a prototype from one vendor and never receiving them only to run out of time to order replacement parts. If the parts or raw materials never arrive, a prototype or the actual system can never ben manufactured.
    b. Upper Bound of Operational Availability: Assuming no system is to be actuated over this course, the operational availability's upper limit could be the predictability based off of the CAD's software or through mathematical analysis measured in uptime/(downtime+uptime).
    Lower Bound of Operational Availability: Again, assuming no system is to be actuated over this course, it could be delivering a prototype/CAD that is inoperable or never delivering a prototype or CAD at all.

c. Upper Bound of Reliability: Assuming no system is to be actuated over this course, the reliability availability could be interpreted as the potential functionality of a CAD, prototype, or the predicted availability of the system based on its design. It's hard to come up with a single measure when the system will not be manufactured.
   Lower Bound of Reliability: Assuming no system is to be actuated again, the lower bound could possibly be creating a CAD, prototype, or doing an analysis of a design where the system would literally not function or be successfully integrated at all so it would have.
d. Upper Bound of Total Ownership Cost: The amount of money in my checking account. Assuming no outside funding from investors, other class members, or MST I am the only one who can pay for the system. This can be measured by logging into my bank account online and verifying the accounts at any given time to compare it to the necessary costs for my system.
   Lower Bound of Total Ownership Cost: Not being allowed to spend money on my system. Again, assuming no outside funding from investors, other class members, or MST that would leave me being the only one who could pay for the system. If a limitation was placed that I couldn't pay for any of the system then the total ownership costs would be approximately $0.
e. Upper Bound of Documentation: The amount of free time I have to put towards documentation. There's more documentation that I could use to track the systems engineering process than I have time available. I could measure this by tracking the time I've put towards documentation relative to the amount of total free time I have and relative to the amount of time I've spent on other aspects of the system. I could also measure in the number of pages produced and also the number of completed documents.
   Lower Bound of Documentation: The bare minimum number of documents required for the class. I would like to do well in this course so I need to do at least the documentation required for the course as part of the systems architecting process. This will have the same measuring standards as the upper bound.

4. Using the references below or your own reference search using google scholar or similar search engines


1. Complex Adaptive Systems Volume 8, Procedia Computer Sciences Volume 140-2018 Cihan H Dagli Editor , Elsevier, SciVerse ScienceDirect ( www.sciencedirct.com) ISSN 1877-0509, November 2018. https://www.sciencedirect.com/journal/procedia-computer-science/vol/140/suppl/C.
2. Complex Adaptive Systems Volume 7, Procedia Computer Sciences Volume 114-2017, Cihan H Dagli Editor , Elsevier, SciVerse ScienceDirect ( www.sciencedirct.com ) ISSN 1877-0509, November 2017. http://www.sciencedirect.com/science/journal/18770509/114
3. Complex Adaptive Systems Volume 6, Procedia Computer Sciences Volume 95-2016, Cihan H Dagli Editor , Elsevier, SciVerse ScienceDirect ( www.sciencedirct.com ) ISSN 1877-0509, November 2017. http://www.sciencedirect.com/science/journal/18770509/95
4. Complex Adaptive Systems Volume 5, Procedia Computer Sciences Volume 61-2015, Cihan H Dagli Editor , Elsevier, SciVerse ScienceDirect ( www.sciencedirct.com ) ISSN 1877-0509, November 2015. http://www.sciencedirect.com/science/journal/18770509/61
5. Complex Adaptive Systems Volume 4, Procedia Computer Sciences Volume 36-2014, Cihan H Dagli Editor , Elsevier, SciVerse ScienceDirect ( www.sciencedirct.com ) ISSN 1877-0509, November 2014. http://www.sciencedirect.com/science/journal/18770509/36
6. Complex Adaptive Systems Volume 3, Procedia Computer Sciences Volume 20-2013, Cihan H Dagli Editor , Elsevier, SciVerse ScienceDirect ( www.sciencedirct.com ) ISSN 1877-0509, November 2013. http://www.sciencedirect.com/science/journal/18770509/20
7. Complex Adaptive Systems Volume 2, Procedia Computer Sciences Volume 12-2012, Cihan H Dagli Editor , Elsevier, SciVerse ScienceDirect ( www.sciencedirct.com) ISSN 1877-0509, November 2012. http://www.sciencedirect.com/science/journal/18770509/12

8. Complex Adaptive Systems Volume 1, Procedia Computer Sciences Volume 6-2011, Cihan H Dagli Editor , Elsevier, SciVerse ScienceDirect ( www.sciencedirct.com) ISSN 1877-0509, November 2011.http://www.sciencedirect.com/science/journal/18770509/6
9. 2015 Conference on Systems Engineering Research Procedia Computer Science Volume 44, Pages 1-718 (2015) Edited by Jon Wade and Robert Cloutier SciVerse ScienceDirect ( www.sciencedirct.com ) ISSN 1877-0509 March 2015 http://www.sciencedirect.com/science/journal/18770509/44
10. 2014 Conference on Systems Engineering Research, Procedia Computer Science, Volume 28, Azad M. Madni and Barry Boehm Editors ( www.sciencedirct.com ) ISSN 1877-0509, March 2014 http://www.sciencedirect.com/science/journal/18770509/28.
11. 2013 Conference on Systems Engineering Research, Procedia Computer Sciences Volume 16 Christiaan J.J. Paredis, Carlee Bishop and Douglas Bodner Editors, Elsevier SciVerse ScienceDirect ( www.sciencedirct.com) ISSN 1877-0509, March 2013 http://www.sciencedirect.com/science/journal/18770509/16
12. New Challenges in Systems Engineering and Architecting, Procedia Computer Sciences Volume 8-2011, Cihan H Dagli Editor, Elsevier, SciVerse ScienceDirect ( www.sciencedirct.com) ISSN 1877-0509, March 2012 http://www.sciencedirect.com/science/journal/18770509/8

select at least five papers that will help you understand architecture assessment, systems architecture, system architecting process, complex systems, systems of systems, meta architectures, architecture generation, and provide 100 word summary of each paper selected.

***Please also upload the papers that you have selected and your project task II as a zip file to Canvas***