

IE-341

Section 1, CRN: 62596/62597/80531-91742

Second Semester 1446 (Spring-2025) – 3(2,1,2)
“HUMAN FACTORS ENGINEERING”

Thursday, January 16, 2025 (16/07/1446H)

Tutorial 1: Reliability

Name:	Student Number: 44	Section: 9-10
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Answer ALL of the following questions

1) Given that an assembly line in a car factory consists of 63 components connected in series.

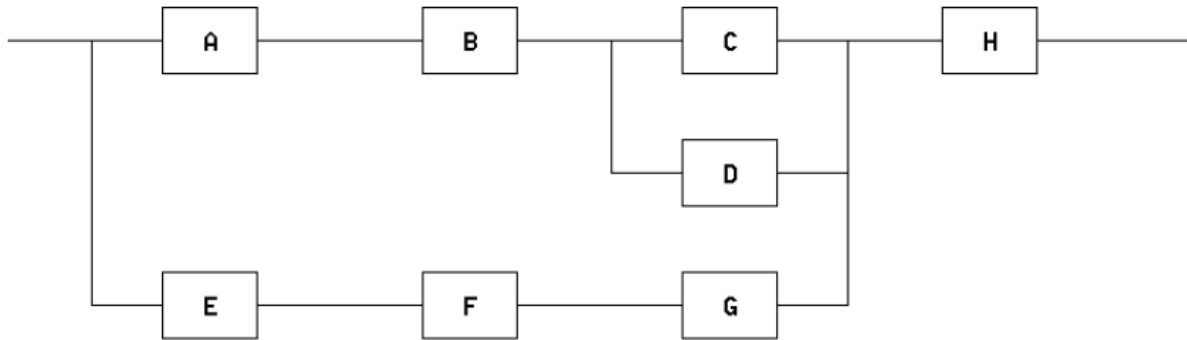
For each of the following cases:

- What is the reliability of the system Rel_{sys} if every component is designed with a reliability (Rel_{comp}) of 92.5%?
- Given all components have the same reliability, and $Rel_{sys} = 0.6$, what is the reliability of any single component?

2) Given a high-tech computer system works such that if one component group fails, four other redundant component groups are integrated to replace the system operation. You are required to find:

- Rel_{sys} if every component group is designed with reliability (Rel_{comp}) of 0.73.
- Rel_{comp} if $Rel_{sys} = 92\%$, and all component groups have the same reliability.

3) Examine the complex series/parallel system configuration below.



Given the reliability at each component is as follows:

$$Rel_A = 0.9$$

$$Rel_B = 0.8$$

$$Rel_C = 0.7$$

$$Rel_D = 0.8$$

$$Rel_E = 0.9$$

$$Rel_F = 0.5$$

$$Rel_G = 0.6$$

$$Rel_H = 0.45$$

You are required to:

- a) Calculate Rel_{sys}
- b) Suggest one way in which the Rel_{sys} can be significantly increased