

IE-341

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

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

Sunday, February 02, 2025 (02/08/1446H)

**Tutorial 4: Hick-Hyman Law**

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

- 1) A choice reaction time experiment was conducted for a hand-eye coordination task (such as the one pictured below). The results are summarized in the table shown below.

Choice(s)	Reaction Time [ms]
1	150
2	300
4	450
8	600



You are required to perform each of the following:

- Calculate the information (in Bits) for each choice.
  - Create a plot of the reaction time vs. information.
  - Generate the Hick-Hyman formula for this experiment.
  - Find the channel capacity.
- 2) Assume that an air traffic controller has a channel capacity (aka bandwidth limit) of 2.8 bits/second in decision making. Assuming equally-likely alternatives, how many choices can this person make per second?
- 3) A display can show one numerical digit (0-9) per second, with equally-likely digits, in a choice reaction time task. If an observer accurately processes the information from the display, what is the observer's channel capacity, in bits/second?

- 4) Consider Question 3 again, with unequally-likely digits. The probabilities of the digits appearing are shown below. Determine the a) channel capacity and the b) redundancy.

Digit	0	1	2	3	4	5	6	7	8	9
Prob	0	.08	.25	.12	.10	.08	.05	.10	.22	0

- 5) Based upon his company experience, Ali knows that 50% of the chips are routed to Line 1, 30% to Line 2, and 20% to Line 3. Given a choice RT intercept of 250 ms, and a processing bandwidth of 7.5 bits/second, how much time does Ali require to make each routing decision? How much faster or slower is this, compared to the condition when all three routes are equally-likely?