

EE/CPE 345: Modeling and Simulation

Homework 4

Problem1: The IQ scores for a sample of 24 students who are entering their first year of high school are:

IQ range interval	Number of students	Relative frequency	Cumulative relative frequency
96-102	2		
103-109	3		
110-116	3		
117-123	4		
124-130	5		
131-137	1		
138-144	4		
145-151	1		
152-158	1		

- Determine and plot the relative frequency (empirical PMF) and the cumulative relative frequency (empirical CDF).
- Determine the average value of the IQ for the sample of students.
- What is the probability that an arbitrary student has an IQ greater than 145 (determined based on the empirical statistics determined above)?

Problem 2: An oil company, has determined that the probability of striking oil on any particular drilling is 0.2.

- Accordingly, what is the probability that it would drill 4 dry wells before striking oil on the fifth drilling? Hint: when determining the corresponding PMF, assume that the company continues to drill until success, then stops.
- Assuming now that the company already has drilled 10 times, what is the probability that $\frac{1}{2}$ of this times it was successful (and consequently found oil)?

Problem 3: Using the example code you have created in the previous homework (tutorial/hw1) please modify my_net2 example, such that the two generators are synchronized, with the sink module acting as a mediator between the two generators:

- Generator 1: generates packets every 300 seconds.
 - Sink receives packet from generator 1, writes a message on the console (“received message from first”) and, after 10 seconds, sends a message to generator 2 (second). Upon receiving the message, generator 2 also creates a packet and sends it to the sink. Sink acknowledges this new packet by writing: “received message from second”, then waits for a new packet from generator1.
- Please note that generator 2 does not create packets unless prompted by the sink.

Note: Save your previous code. More specifically, for this new homework, create a new directory my_example2 and copy the pertinent files there and modify them.