American University of Beirut
Faculty of Engineering and Architecture
Engineering Management Program
ENMG 501: Engineering Management II

Probability Problems– HW#1

1. Telephone area codes in a certain country consist of three digits. The first digit is an integer between 2 and 9. The second digit is either 0 or 1. The last digit is an integer between 1 and 9. How many area codes starting with a 4 are possible?

2. There are three coins in a box. One is a 2-headed coin. The second is a fair coin. The third is a biased coin that comes up heads 75 % of the times. One coin is selected at random from the box and then flipped. What is the probability of a head showing up?

3. A machine is to be calibrated every morning before it starts production. The machine operator remembers to calibrate the machine 90 % of the times. During any given day, if the machine is calibrated, it will produce 7 % defects. Without calibration, it will produce 30 % defects. What is the probability that the operator forgot to calibrate the machine today, if he has just noticed a defective part coming out of the machine?

4. An automotive breaking device consists of 2 subsystems: an electric subsystem and a hydraulic subsystem. There is 10% chance that the device will fail due to an electric failure and 16% chance that it will fail due to a hydraulic failure. The device can also fail due to both subsystems failing together with a 4% probability. What is the probability that a randomly selected breaking device does not fail?

5. A company consists of 5 mechanical engineers and 6 computer engineers. A team is to be formed by randomly selecting SEVEN engineers from the company. If you are interested in recording the possible number of computer engineers in the team, what is the sample space?

6. There are five hotels in a certain town If 3 people check into hotels in a certain day, what is the probability that at least 2 out of the 3 people check into the same hotel?

7. There are three independent critical components that are responsible for the functioning of a machining center. These 3 components are of similar type and perform the same function. The machining center will work as long as at least one of these components functions properly. The probability that a component will not function properly is 0.4. What is the probability that the machining center will function without failing?

8. The probability that a regularly scheduled flight departs on time is 0.83, the probability that it arrives on time is 0.82, and the probability that it departs and arrives on time is 0.78. Find the probability that a plane departed on time given that it has arrived on time?