IE102 Spring 2017 Homework I - Due: February 27, Monday 17:00

IMPORTANT: READ BEFORE YOU START WORKING ON THE HOMEWORK

Information on Homework I

- **Homework I is 3%. Make sure that you review course material before you start. Cite sources used if any.**
- **Homework assignment will be conduct in groups of 2. We randomly form the groups. You can find your group member and his/her contact information at the course website.**
- **Grading Policy:** The homework grades will not be only based on the correctness of the answers provided, but on the perceived degree of effort on the returned assignment. There exists no motive for the students to copy the answers from someone else, since even without obtaining the correct answers one can obtain full credit. The grading scale for each question is 2 points (full effort), 1 point (some effort), and 0 (no effort or no submission).
- **Academic Dishonesty (taken from IE102 Course Information):** Academic misconduct is not tolerated, and violations will be treated in accordance with the University policy. For assignments: Discussion of the course material and working in groups are effective ways of learning. However, this does not mean that you can copy the assignment from one of your friends. You can discuss with your friends, but you should be alone, without any written solution in front of you, when you actually prepare your assignment. It is extremely important to understand the value of this exercise in the process of learning. Any violation of the above understanding will result measures outlined in the student rules and regulations.
- **Submission Information:** An assignment submission box will be placed in front of office EA325 one day before submission date and will be removed at the time of the deadline. You need to put your assignment in the designated box before the submission deadline. **Submission via e-mail is NOT accepted.**
- **Question 4 will be covered in February 22, Wednesday Lecture.**

1) Consider a Human Resources (HR) Department. Our aim is to follow the typical set of activities carried for hiring new personnel.

The process starts by identification of staffing needs by the concerned department. They define and write up job description and send a personnel request form to HR. Then, HR Department prepares a job announcement and sends it to Public Relations (PR) Department. PR made the job announcement available publicly through internet and newspapers.

After a specified period, HR gathers CVs (curriculum vitae – information on the applicants regarding the required job), screens qualified ones and sends their CVs to relevant department. The CVs are also screened by the department identifying the applicants who do not fit the position required and sent back to HR. HR controls the files, arranges meetings with candidates and develops interview questions for each of them based on their CVs. Then, HR conducts the interviews, which are approximately 2 hours per candidate. Once the interviews are over, the candidate with the highest score is selected. HR determines the pay range and makes an employment offer to the candidate. If the candidate accepts the offer, s/he will be hired.

a) Use a worker process chart to describe what HR is doing.
b) Use a flow process chart to describe the process of hiring new personnel.
(Use Operation, Inspection, Move and Delay symbols (O, I, M and D))

2) A motorist experienced a flat tire on the driver side rear wheel of his car and went through the following procedure to replace the flat tire with the spare. He first places the car to a flat, safe area like parking lot. He then sets the emergency brake and takes the crank, jack, and lug nut wrench out of the car. He removes the spare tire from the trunk and placed it near the rear left wheel. Next, he proceeds to position the jack in the proper position under the car and jack up the wheel slightly so the rubber is still touching the road. Then, he loosens the five lug nuts. He then returns to jacking up the car so that the wheel is completely off of the ground. Next step is to remove all the lug nuts and the tire. Then, he brings the spare tire, puts the spare tire on, tighten each lug nut. Next, he lowers the car by cranking the jack down slowly until the spare tire supported the car. He again checks the five lug nuts. Lastly, he moves and puts hardware and the flat tire to the trunk.

Describe the tire changing procedure using a worker process chart.

3) A foundry uses the following steps in its procedure for high production of investment casting process: **(1)** The first step is to produce wax patterns by injection molding. **(2)** The wax patterns are transported to an assembly work area where they are manually assembled to a wax sprue forming a pattern tree. The entire tree is made of wax. **(3)** The pattern tree is moved to a separate room where the tree is coated with a thin layer of refractory material. **(4)** In the same room, the tree is coated with success layers of refractory material to make it a rigid structure that will become the mold for casting. **(5)** The tree is moved to a furnace room, where it is held in an inverted position and heated to melt the wax out of the mold cavities. With the wax removed, the rigid structure is now a multiple-cavity mold with runners leading to each cavity from the sprue cavity. **(6)** In the same furnace room, the mold is now heated to a high temperature to ensure that all contaminants are removed from the mold. **(7)** With the mold still heated at an elevated temperature and in an upright orientation, molten metal is poured into the sprue and flows through the runners to each cavity. **(8)** After cooling and solidification of the metal, the assemblage is moved to a finishing room, where the mold is broken away from the cast metal and the parts are separated from the runners and sprue.

(a) Develop the flow process chart for this casting process.
(b) What are the possible improvements that you would recommend? What will be your performance measure (or measures) you use while identifying these improvements?

4) The trend in working as a customer oriented company and producing specialized products for the customer needs is becoming a very important issue in the global world. In order to adapt this trend, dishwasher plant of a company produces more than 500 dishwasher models, and most of them are exported. Some of the produced models are called high-end models, which have more complicated structure and hence low demand and are more expensive. Producing high-end models and regular models, which have common structure, in the same assembly line causes inefficient production. There are problems about material transfer to assembly lines for high-end models. In the production of regular models, parts are transferred by standard sized boxes to assembly line. On the other hand, in the production of high-end models, parts should be transferred as smaller sized parties. Furthermore, when high-end and regular models are produced in the same assembly line, there occurs assembly line balancing problem because of the fact that required labor per high-end model is greater than required labor per regular model during the production on assembly line.

This is a challenging problem that contains efficiency and effectiveness issues. What are the possible performance measures you would use for this situation? Give two examples, and describe how you are planning to measure each.