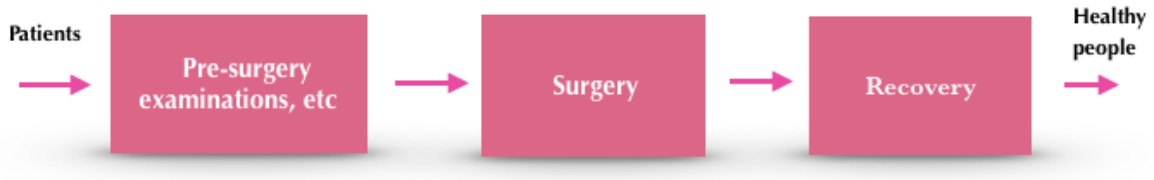
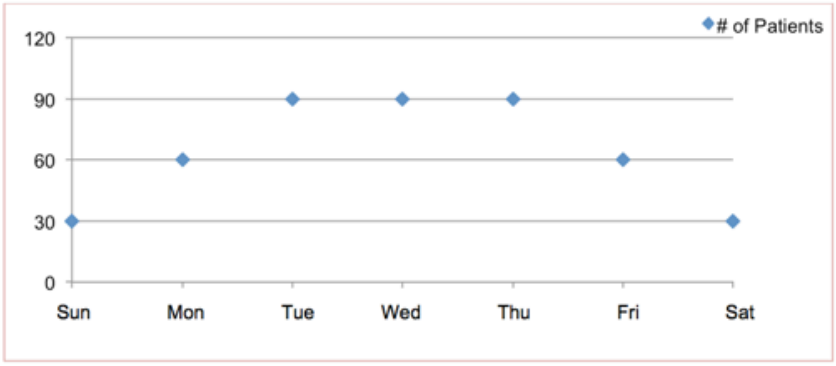


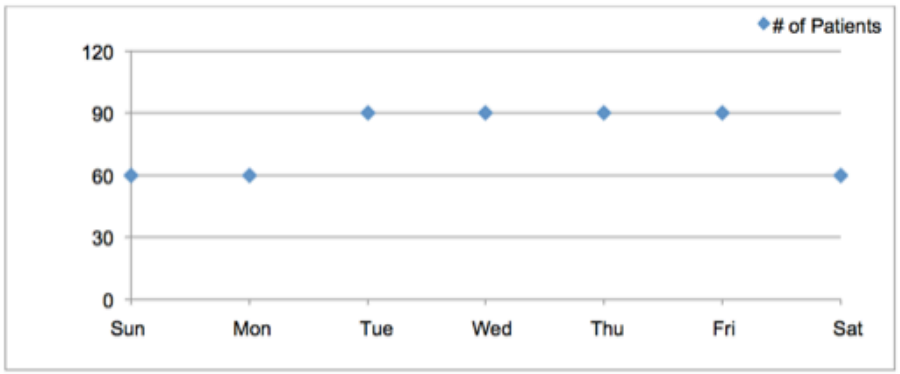
1) Consider the linear flow chart consisting the following three steps: pre-surgery, examination, orientation
   a) What is the flow unit?
      The flow unit is a patient at Shouldice Hospital.
   b) What are the resources needed for each of the above tasks
      i) Pre-surgery: admissions clerk, paper/computer, nurses, equipment for blood and urine test, laboratory, examination rooms, common dinning room, lounge area, tea, cookies, beds.
      ii) Surgery: local anesthetics, surgeons, assistant surgeons, operating table, surgery equipment, skin clips
      iii) Recovery: wheelchairs, patient recovery room, lounge area, cookies, tea, beds
2) Answer the following questions
   a) What is the capacity rate (per week) of the hospital?
      surgeons: 240 patients/week 4 patients x 5 days x 12 surgeons = 240 patients/ week
      beds: 210 patients/week 30 patients x 7days= 210 patients/week, assume that hospital week begins on Sunday, the hospital can accept a maximum of 30 patients per day, through Sunday to Saturday (7 days)
      operating room: 280 patients/week 8hors x 5 rooms x 7 days= 280 patients/week
   b) How well is the hospital currently utilizing its bed?
      Average utilization= input rate/ capacity rate= 150 patients per week/210 patients per week= 71.43%
   c) How many patients will be in the hospital during each day of the week? Drew an inventory build-up diagram with days of the week plotted on the horizontal axis and number of patients plotted on the vertical axis.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Input rate	30	30	30	30	30	0	0
Inventory buildup	30	60	90	90	90	60	30
Capacity rate	90	90	90	90	90	90	90
Excess demand	0	0	0	0	0	0	0
Excess capacity	60	30	0	0	0	30	60



3) The vice president of the hospital wants to increase the capacity of the hospital. he has a target of increasing the weekly capacity rate by 20% (as compared to the capacity rate of question 2 (I)). one option to increase capacity is to add Saturday operations (i.e. admit 30 patients on Friday for Saturday operation, while still maintaining operations from Monday to Friday)
   a) How well will the hospital utilize its bed?
      total beds available per week = 210 beds/ week
      total beds used per week = 150 + 30 = 180 beds/ week
      average utilization of beds = 180/ 210 = 85.7%
   b) How many patients will be in the hospital during each day of the week? Draw an inventory build-up diagram with days of the week plotted on the horizontal axis and number of patients plotted on the vertical axis.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
input rate	30	30	30	30	30	30	0
inventory buildup	60	60	90	90	90	90	90
capacity rate	90	90	90	90	90	90	90
excess demand	0	0	0	0	0	0	0
excess capacity	30	30	0	0	0	0	0
utilization	66.67%	66.67%	100%	100%	100%	100%	66.67%



4) The surgeons and other hospital unions reject the idea of having Saturday operations. the vice president is determined to increase the capacity rate (maximum output rate) by 20% without changing the Shouldice practice (i.e. each surgeon still operates on four patients per day; each operation still takes one hour; operating rooms can be used from 7:30 am till 3:30pm; the hospital committed to three process).
   a) Does any capacity need to be added to the hospital? if so, what resources need to be added?
      The bottleneck of the hospital operation is beds; therefore, more beds can be added to increase the throughput rate.
   b) Suggest a plan to increase the capacity (maximum output) rate of the hospital by 20% while maintaining five-day operations and adding as few additional resources as possible (healthcare resources are expensive!).
      In order to increase capacity rate by 20%, it means Shouldice need to achieve 180 patients week. Therefore, Shouldice needs to admit 36 operations per day. From Sunday to Thursday, if the hospital admit 36 patients per day, they need to have 108 beds. Thus, 18 more beds will be needed (108 - 90=18).