

本試題是否可以計算機： 可使用， 不可使用（請命題老師勾選）

一、(25%)

The Farmer's Hardware and Feed Store is preparing a fertilizer mix for a farmer who is preparing a field to plant a crop. The store will use two brands of fertilizer, Super-gro and Crop-quik, to make the proper mix for the farmer. Each brand yields a specific amount of nitrogen and phosphate, as follows:

CHEMICAL CONTRIBUTION		
Brand	Nitrogen(lb/bag)	Phosphate(lb/bag)
Super-gro	2	4
Crop-quik	4	3

The farmer's field requires at least 16 pounds of nitrogen and 24 pounds of phosphate. Super-gro costs \$6 per bag, and Crop-quik costs \$3. The store wants to know how many bags of each brand to purchase to minimize the total cost of fertilizing.

Formulate a linear programming model for this problem, and solve it using the graphical method.

二、(25%)

Because of the approaching holiday season, Joe Palotty is scheduled to work 7 days a week for the next 2 months. October's work for Joe consists of five jobs, A, B, C, D, and E. Job A takes 5 days to complete and is due on day 10, job B takes 10 days to complete and is due on day 15, job C takes 2 days to process and is due on day 5, job D takes 8 days to process and is due on day 12, and job E, which takes 6 days to process, is due on day 8.

There are 120 possible sequences for the five jobs. Clearly, enumeration is impossible. Let's try some simple sequencing rules. Sequence the jobs by

(a) first-come, first-served (FCFS), (b) earliest due date (EDD), (c) minimum slack (SLACK), and (d) shortest processing time (SPT). Determine the completion time and tardiness of each job under each sequencing rule. Should Joe process his work as is—first-come, first-served? If not, what sequencing rule would you recommend to Joe?

(背面仍有題目,請繼續作答)

編號：F 369 系所：工業與資訊管理學系丙組

科目：生產與作業管理

本試題是否可以使用計算機： 可使用， 不可使用（請命題老師勾選）

三、Please try to apply "Enterprise Resource Planning (ERP)" for doing a research about commercializing a new product. (Plot a figure to explain it) (15%)

四、There is a company produces three products(A、B、C). The related processing time、setup time、lot size and demand forecasts are given in following table. The firm operates two 8-hour shifts, 5days per week, 50 weeks per year. Experience shows that a capacity cushion of 5 percent is sufficient. How many machines are needed? (15%)

Product	Time Standards		Lot Size (pair/lot)	Demand Forecast (pairs/yr)
	Processing (hr/pair)	Set up (hr/lot)		
A	0.05	0.5	240	80000
B	0.10	2.2	180	60000
C	0.02	3.8	360	120000

五、Using the PERT three-estimate approach, a project manager has obtained the following estimates of the duration of each activity.

Task	Time Required (day)			Immediate Predecessors
	Optimistic	Most likely	Pessimistic	
A	3	4	5	-----
B	2	2	2	A
C	3	5	6	B
D	1	3	5	A
E	2	3	5	B,D

- Find the mean critical path. (10%)
- Find the approximate probability that the project will finish within 11 day. (10%) (Please write down the related equations and estimate a rough a value.)