Management Practice

Revision class

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Information exam

C27 Management Practice

4th Years - C27 Management Practice

1.5 hrs

4 questions – You have to answer 3 of them.

B2E2 Entrepreneurship, Management and Strategy

3rd Years - B2E2 - (This is combined “Part I” and “Part II” material)

3hrs

6 questions – You have to answer 4 of them.

Previous exam paper

- Exam papers are a good reflection of the exam (for both B2E2 and C27).

- The example sheets are representative of the exam questions, but scoring focuses on analysing and evaluating.

Revision session

- A question will be shown along with the time provided (1 minute warning).

Question 1 (10 mins)

- You are given the processing time array *p = [12 11 8 6 4 2 1],* with a release time of *r = [0 0 0 0 0 0 0],* compute the average Flowtime using the SPT (Shortest Processing Time) and provide proof why SPT can minimize the average flow time.

[5 Marks]

Question 1 solution

i is the job number and *n* is the total number of jobs.

The total Flowtime is $\sum F_i = \sum C_i - r_i$ with a sequence given by $p_1 \leq p_2 \leq \dots p_n$ *and* $r_i = 0$.

Proof

$$C_1 = p_1$$
$$C_2 = p_1 + p_2$$
$$C_i = p_1 + p_2 + \cdots p_i$$

$i \leq n$

$$\sum C_i - r_i = \sum C_i - 0 = \sum C_i$$

$$\sum C_i = (p_1) + (p_1 + p_2) + \cdots + (p_1 + p_2 \dots + p_i)$$

$$\sum C_i = (np_1) + ((n-1)p_2) + \cdots + (p_n) = \sum_{i=1}^{n} (n - i + 1)p_i$$

We have a product of two vectors. The first vector $(n - i + 1)$ is a decreasing vector $[n;\ n-1; \dots; 1]$. In order to get the minimum sum the second vector needs to be non-decreasing . For a given *n* a lower total flow time will also yield a lower average, as n^{-1} is a scaling parameter that is constant for a given *n*.

The average Flowtime is given by $\sum \boldsymbol{C_i}$=1+(1+2)+(1+2+4)+… $\sum \boldsymbol{C_i}$=1+3+7+13+21+32+44=121 $\bar{F} = \frac{121}{7} = 17.28 \dots$

Question 2 (5 mins)

- Define the concept of lateness, an early job and a tardy job. Provide a single equation to explain these three concepts.

[1 Mark]

Optimality criteria

C_i = The completion time of job J_i — $C_i \neq p_i \ \forall \ i=2:n$

F_i = The flow time of job J_i — $C_i - r_i$

L_i = Lateness of job J_i — $C_i - d_i$

T_i = Tardiness of job J_i — $max\{0, L_i\}$

E_i = Earliness of job J_i — $max\{0, -L_i\}$

$\delta_i = 1$ if job i is tardy ($T_i > 0$)

$\delta_i = 0$ if job i is in time ($T_i = 0$)

$$C_{max} = Max_{i=1:n}\{C_i\}$$ Makespan

$$L_{max} = Max_{i=1:n}\{L_i\}$$ Maximum lateness

$$T_{max} = Max_{i=1:n}\{T_i\}$$ Maximum tardiness

Question 2 solution

The term lateness is a general term used to represent the deviation from the deadline.

Lateness $\boldsymbol{L_i = C_i - d_i}$ with d_i being the deadline for the job i and C_i is the completion time of job i.

If L_i is tardy it is positive and early if it is negative.

Question 3 (10 mins)

- Draw a graph of an initial supplier that provides materials to the supplier of a focal firm who creates a product for an ultimate customer by selling their product to a customer. The graph should include: “Initial supplier” that supplies a “Supplier”, “Ultimate customer” serviced by the “Customer” and “Focal firm” between “Supplier” and “Customer”.
- Quantify and comment on the information risk using the graph, as well as how this can be mitigated.

[4 Marks]

Question 3 solution

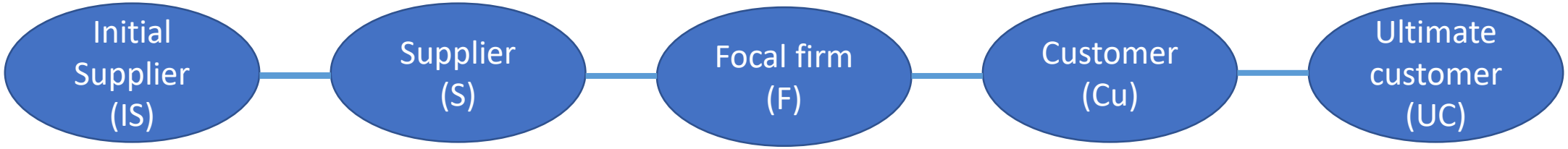
We are looking at an extended supply chain (*N=5*) and we can assess risk by looking at closeness centrality (*C*).

Information risk is not equal for each vertex in the extended supply chain.

Reduce risk by introducing an extra edge between vertices with lowest values in *C.*

$$\sum_y d(x,y) \qquad C(x) = \frac{N-1}{\sum_y d(x,y)}$$

	IS	S	F	Cu	UC		
IS	0	1	2	3	4	10	.4
S	1	0	1	2	3	7	.57
F	2	1	0	1	2	6	.67
Cu	3	2	1	0	1	7	.57
UC	4	3	2	1	0	10	.4



Question 4 (10 mins)

Compute the strength of the relationship between salary and sharing knowledge for employees operating in a virtual team. Comment on the obtained finding.

[5 Marks]

Person	Salary (x£1000)	Number of Knowledge Sharing activities
1	51	62
2	58	68
3	62	66
4	65	66
5	68	67
6	76	72
7	77	73
8	78	72
9	78	78
10	84	73
11	85	76
12	91	75
Σ	**873**	**848**
SD	**11.99**	**4.81**

MPiE

Person	x	y	xy
1	51	62	3162
2	58	68	3944
3	62	66	4092
4	65	66	4290
5	68	67	4556
6	76	72	5472
7	77	73	5621
8	78	72	5616
9	78	78	6084
10	84	73	6132
11	85	76	6460
12	91	75	6825
∑	**873**	**848**	**62254**
Mean	**72.75**	**70.66667**	
s	**11.99**	**4.81**	

$$r = \frac{\sum_{i=1}^{n}(x_i-\bar{x})(y_i-\bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i-\bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i-\bar{y})^2}} = 0.885$$

$$r = \frac{n\Sigma(xy)-\Sigma x\cdot\Sigma y}{n(n-1)s_x s_y} = \frac{12(62254)-(873)(848)}{12(11)(11.99)(4.81)} = 0.885$$

$$s_x = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i-\bar{x})^2}$$

Shared knowledge facilitates shared understanding (a collective way of organizing relevant knowledge), which can have a significant impact on the ability of teams to coordinate work and perform well within a virtual environment. Knowledge sharing facilitates collaboration and trust and thus team effectiveness. The obtained relations could indicate a reward or competence scheme.

Alsharo et al, 2017

Questions?

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