



Exam 9 November 2018, questions

e-Business Software Technologies (Monash University)



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Semester Two 2018
Examination Period
Faculty of Information Technology
Sample Exam Paper (Suggested Solutions)

EXAM CODES: FIT2090
TITLE OF PAPER: Business Information Systems and Processes – Paper 1
EXAM DURATION: 2 hours writing time
READING TIME: 10 minutes

THIS PAPER IS FOR STUDENTS STUDYING AT: (tick where applicable)

☐ Berwick ☒ Clayton ☐ Malaysia ☐ Off Campus Learning ☐ Open Learning
☐ Caulfield ☐ Gippsland ☐ Peninsula ☐ Monash Extension ☒ Sth Africa
☐ Parkville ☐ Other (specify)

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AUTHORISED MATERIALS

OPEN BOOK ☐ YES ☒ NO
CALCULATORS ☒ YES ☐ NO
SPECIFICALLY PERMITTED ITEMS ☐ YES ☒ NO
 if yes, items permitted are:

Candidates must complete this section if required to write answers within this paper

STUDENT ID: _____

DESK NUMBER: _____

GENERAL INSTRUCTIONS

1. This exam is divided into **2** Sections.
2. Attempt **ALL** questions in this examination.
3. For Section A, using the Multiple-Choice Form, mark your answers for Section A by shading the letter with a pencil corresponding to the ONE **best** answer
 - 1 mark for a correct answer
 - 0 marks for a wrong, no answer or more than one answer
4. For Section B write your answers in the spaces provided in this examination paper.
5. You may request for an examination script book if needed.
6. Clearly label each of your answers in the examination paper/script book.

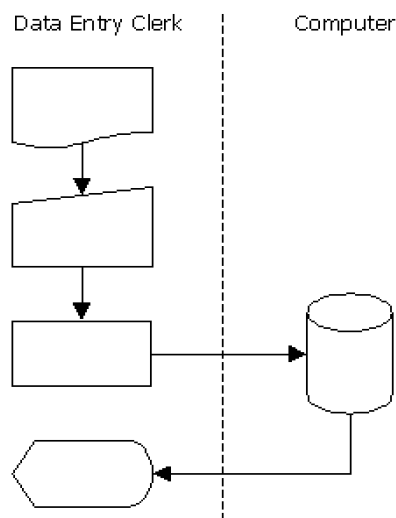
SECTION	QUESTIONS	MARKS
SECTION A.	Multiple Choice.	(20 x 1 mark = 20 marks)
SECTION B.	Short Answers.	(6 x 10 marks = 60 marks)

Section A (10 marks)

1. Which of the following data flow diagram (DFD) guidelines is incorrect?
- A. include within the system context any entity that performs one or more information processing activities
 - B. read computer data stores from the process bubble that requires the data
 - C. include within the system context any entity in the system narrative
 - D. data flows should never go from higher- to lower-numbered bubbles

Answer C

2. The following systems flowchart segment depicts a data entry clerk keying data from a source document into a business event data store. Which statement is correct?



- A. The systems flowchart was created properly.
- B. The arrow between the computer process and the data store should be bi-directional.
- C. The computer process should be shown in the computer column.
- D. The second symbol in the data entry clerk column should be a square.

Answer C

3. The term _____ is a visual tool that is used to authorize production.
- a. kanban
 - b. muda
 - c. Heijunka box
 - d. poka-yoke

Answer A

4. Six Sigma is a methodology designed to be _____.

- a. a philosophy or organizational quality cultural.
- b. a statistical meaning for control charts.
- c. a statistical approach for detecting 3.4 parts per million measurement opportunities.
- d. a growing trend for process improvement.

Answer A

5. What we refer to today as ERP evolved from _____.
- a. SRM
 - b. MRP
 - c. JIT
 - d. ECM

Answer B

6. Which of the following is a type of effectiveness BIS metric?
- a. Transaction speed
 - b. System availability
 - c. Usability
 - d. Throughput

Answer C

7. Jenny Lim works as the Chief Knowledge Officer for Bright Star Company. She has been given the responsibility to create a product or service that will bring an added value to its customers to increase the company's revenue. Jenny determines that the best value she can add is by creating a service that offers free next day shipping on any order over \$50. Where in the value chain is Jenny adding value?
- a. The primary value activity outbound logistics.
 - b. The primary value activity inbound logistics.
 - c. The primary value activity marketing and sales.
 - d. The primary value activity operations.

Answer A

8. Which of the following is considered information?
- a. Date Sold
 - b. Quantity Sold
 - c. Best-selling item by month
 - d. All the answers are correct

Answer C

9. Data is useful for understanding individual sales, but to gain deeper insight into a business data needs to be turned into information. Which of the following offers an example of turning data into information?
- a. Who are my best customers?
 - b. What is my best-selling product?
 - c. What is my worst-selling product?
 - d. All the answers are correct

Answer D

10. Which of the following is not a typical way that a company would duplicate a competitive advantage?
- a. Acquiring the new technology
 - b. Copying the business operations.
 - c. Hiring away key employees
 - d. Carrying large product inventories

Answer D

11. The Victory Wireless store in Denver is currently offering a fabulous marketing strategy for potential new iPhone customers. Victory Wireless offers customers who purchase an iPhone with a two-year subscription a free Otter phone case, car charger, ear phones and speakers. In terms of Porter's five forces, what is Victory Wireless attempting to achieve with this marketing strategy?
- a. Increase buyer power
 - b. Increase substitute products
 - c. Decrease supplier power
 - d. Decrease buyer power

Answer D

12. Drew Savage is an MIS manager for an international consulting firm. Drew travels to different European countries where he implements news response tracking systems. Some of the metrics he uses to track the performance of his system include tracking the response time it takes to respond to Twitter posts mentioning the news station, as well as the speed and accuracy of content posted on numerous websites and social media sites. What type of metrics is Drew using to measure his system?
- a. Customer satisfaction metrics
 - b. Efficiency metrics
 - c. Effectiveness metrics
 - d. Benchmarking metrics

Answer B

13. A transaction processing system (TPS) is the basic business system that assists operational level analysts when making structured decisions. Which of the below is not an example of a TPS?
- a. Target's internal company payroll system
 - b. Comfort Dental patient diagnosis system
 - c. First Bank's overall accounting system
 - d. Stewart Sport's order entry system

Answer B

14. Which of the following is NOT one of five forces identified in Michael Porter's five-forces model?
- a. The rivalry among existing competitors
 - b. The threat of new entrants
 - c. The threat of substitute products and services
 - d. The threat of new information systems

Answer D

15. If an industry has low entry and exit costs and the technology needed to start and maintain a business is commonly available, this creates:
- a. a threat of new entrants.
 - b. a threat of substitute products and services.
 - c. an increased bargaining power of customers and suppliers.
 - d. a rivalry among existing competitors.

Answer A

16. A symbol used in data flow diagrams (DFDs) to depict an entity or process within which incoming data flows are transformed into outgoing data flows is a(n):
- a. data flow symbol
 - b. external entity symbol
 - c. bubble symbol
 - d. data store symbol

Answer C

17. Which data flow diagram (DFD) symbol portrays a source or destination of data outside the system?

- a. data flow symbol
- b. external entity symbol
- c. bubble symbol
- d. data store symbol

Answer B

18. Those entities which perform no information processing activities for the system are called:

- a. environmental entities
- b. internal entities
- c. boundary entities
- d. external entities

Answer D

19. Which of the following data flow diagram (DFD) guidelines is **correct**?

- a. Include within the system context any entity that performs one or more information processing activities.
- b. Read computer data stores from the bubble that requires the data
- c. Include within the system context any entity in the system narrative
- d. Data flows should never go from higher- to lower-numbered bubbles

Answer A

20. A business process _____

- a. is a network comprising activities that have precedence relationships
- b. can affect the efficiency of operations in the organisation
- c. that cuts across functional areas of an organisation may need to be re-designed
- d. All of the above

Answer D

Section B (60 marks)

Question 1 (10 marks)

- a. Would you agree that most organisations tend to make IT outsourcing decisions based on an economic perspective? Present your views. **(3 marks)**
- b. Identify two factors that may encourage IT insourcing. **(3 marks)**
- c. Why do some organisations prefer selective IT outsourcing? Discuss. **(4 marks)**

Answer

- a. Although the economic perspective is important, it may not always influence IT outsourcing decisions due to the following reasons:
 - i. Often costs and benefits involved particularly in the long term are hard to predict accurately;
 - ii. Organisations are fundamentally political entities and many decisions including IT outsourcing is influenced by power and politics. One cannot assume that organisations always follow a rational decision rooted in economic perspective.
- b. Various factors, e.g.
 - i. Nature of IT application :Keep strategic (mission critical) applications in-house as more intimate knowledge of business is needed which can easily be found with internal staff
 - ii. Greater loyalty and Tacit organisational knowledge of internal IT staff
 - iii. When external IT vendors are either less reliable or have past histories of delivering unsatisfactory services
- c. Selective outsourcing is recommended when the level of technology involved in a particular IT application is complex. It is less risky than turning over responsibility for the entire IT function to an IT vendor. It can become the basis for establishing a partnership with the vendor that develops over time. It is more popular among large companies. Etc.

Question 2 (10 marks)

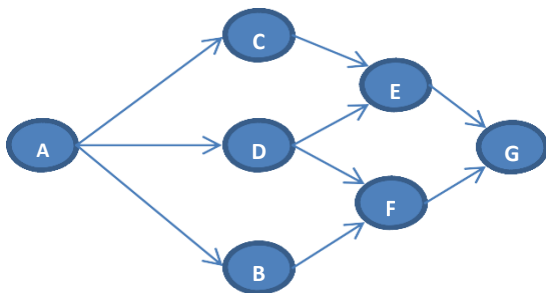
ABC Credit receives an average of 1,200 credit applications per day. ABC's advertising touts its efficiency in responding to all applications within hours. Daily application-processing activities, average times, and required preceding activities (activities that must be completed before the next activity) are listed below:

Activity	Time (minutes)	Immediate predecessor
A	0.18	None
B	0.22	A
C	0.15	A
D	0.11	A
E	0.25	C and D
F	0.29	B and D
G	0.40	E and F
Total	1.60	

- Draw a precedence diagram. (1%)
- Assuming an 8-hour day and using the longest activity rule as the primary rule to assign activities to stations. (6%)
- Compare the efficiency of the line with the theoretical maximum efficiency. (3%)

Answer

a)



- Cycle time per workstation = $480/1200 = 0.4$ min/application

Station	Activities	Total time	Idle time
1	A and B	$0.18 + 0.22 = 0.4$	0.0
2	C and D	$0.15 + 0.11 = 0.26$	0.14
3	F	0.29	0.11
4	E	0.25	0.15
5	G	0.4	0.0
	Total	1.60	0.40

- Theoretic minimum = $1.60 \text{ min} / 0.4 \text{ min} = 4$

Stations Efficiency = $1.60 / (5 \times 0.4) = 80\%$

Not achieving maximum efficiency since the actual workstations are more than the theoretical minimum workstations

Question 3 (10 marks)

- a) Load distance analysis is often used to design facilities layout. Define the load distance score. (2%)
- b) A company with 4 departments has the load matrix in Table 1 and the current layout is shown in Figure 1.

TABLE 1: Load Matrix

From/To	B	C	D
A	12	10	8
B		20	6

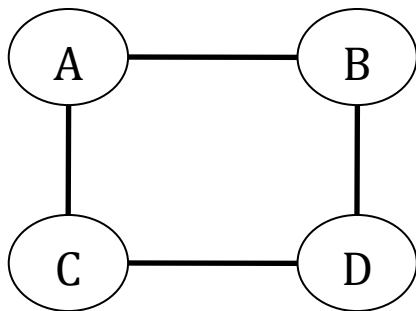


Figure 1. Current Layout of the 4 departments.

- What is the load-score for the current layout? Assume rectilinear distance. (3%)
- Find a better layout for the company giving its total load-distance score. (5%)

Answer

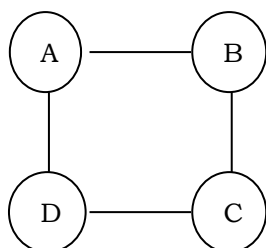
- a. It measures the 'attraction' between two centres. It is defined as:

$$\text{LD score (i,j)} = \text{Load (i,j)} \times \text{Distance (i,j)}$$

- b.

Centres	Load	i. Current Design		ii. New Design	
		Distance	LD score	Distance (see layout below)	LD score
(A,B)	12	1	12	1	12
(A,C)	10	1	10	2	20
(A,D)	8	2	16	1	8
(B,C)	20	2	40	1	20
(B,D)	6	1	6	2	12
		Total	84		72

To improve the layout design further we can look at the LD scores in a) above and try to decrease the distance for the pairs with the highest scores.



Question 4 (10 marks)

- a) What are the charts that are typically used for process flow analysis? (2%)
- b) Physical arrangements of people, equipment and space are important in process design. Location of work centres/work stations affects process efficiency. What is method used to calculate the distances between work centres/work stations? (2%)
- c) Why is it important to continually monitor process performance? (2%)
- d) A branch office of the University Federal Credit Union processes 3,000 loan applications per year. On average, loan applications are processed in 2 weeks. Assuming 50 weeks per year, how many loan applications can be found in the various stages of processing within the bank at any given time? (4%)

Answer

- a) General process chart, process flow diagram, process activity chart, flow-chart
- b) The load-distance (LD) score is used. It measures the 'attraction' between two centres. It is defined as:
$$LD \text{ score}(i,j) = \text{Load}(I,j) \times \text{Distance}(i,j)$$
- c) When processes do not achieve the intended outcomes, managers and users want to be notified, so redesigns, repairs, or rethinking can occur to fix problems or otherwise get processes back to desired performance levels. To accomplish this, performance measurement systems must be in place to continually test or monitor process outputs and compare them to desired outcomes or standards.
- d) λ = Throughput (arrival) rate = 3000 applications per year
CT = Average time each application spends in the system = 2 weeks = (2/50) years
WIP = Average number of applications in the system
 $WIP = \lambda CT = 3000(2/50) = 120$

Question 5 (10 marks)

- a) What is the relationship between WIP and the input and output rates over time? (5 marks)

Answer

Define:

$R_i(t)$ = rate of incoming jobs through all entry points into the process

$R_o(t)$ = rate of outgoing jobs through all exit points from the process

Because the inflow rate and the outflow rate vary over time, the work-in-process also fluctuates. We refer to the work-in-process at time t as $WIP(t)$. The up and down fluctuation of $WIP(t)$ obeys the following rules:

- $WIP(t)$ increases when $R_i(t) > R_o(t)$. The increase rate is $R_i(t) - R_o(t)$.
- $WIP(t)$ decreases when $R_i(t) < R_o(t)$. The decrease rate is $R_o(t) - R_i(t)$.

Figure 5 shows the work-in-process level as observed over a period of time.

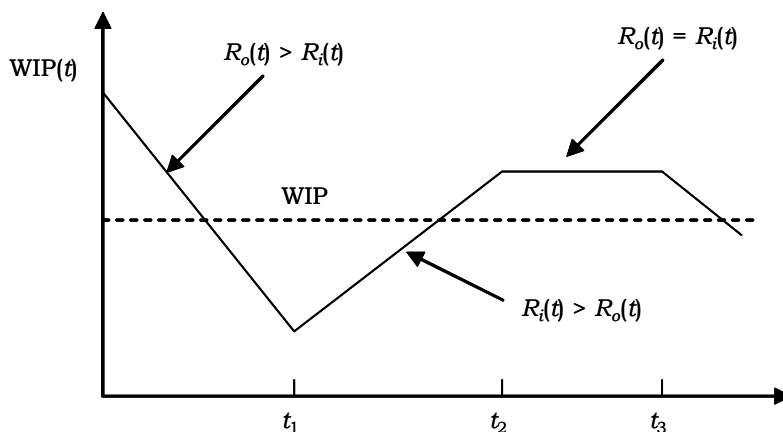


Figure 5 Work-in-process level over time

From the beginning of the observation horizon to the time labeled as t_1 , the outflow rate is larger than the inflow rate, and therefore the work-in-process is depleted at a rate that is the difference between the two flow rates. That is, the work-in-process decreases at a rate of $R_o(t) - R_i(t)$ during the beginning of the observation period until time t_1 . During the time period from t_1 to t_2 , the inflow rate is larger than the outflow rate and therefore the work-in-process increases. The work-in-process stays constant from time t_2 to time t_3 , indicating that the inflow and the outflow rates are equal during this period.

The average work-in-process is also of interest. To calculate the average WIP, we add the number of jobs in the process during each period of time and divide the sum by the number of periods in the observed time horizon. We will use WIP to denote the average (or expected) number of jobs in the process. The dashed line in Figure 6 represents the average work-in-process during the observed period.

b) Consider the process flow chart in Figure 5.2. The estimated waiting time and processing time for each activity in the process are shown in Table 5.2. All times are given in minutes.

Calculate the average CT for this process. **(2 marks)**

Calculate the CT efficiency. **(3 marks)**

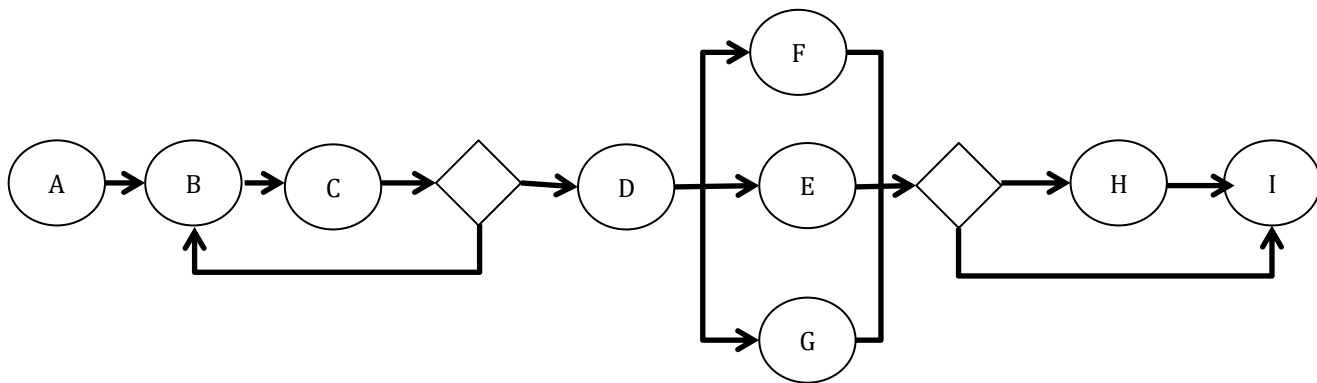


Figure 5.2

Table 5.2

Activity	Waiting Time (min)	Processing Time (min)
A	7	3
B	5	8
C	4	2
D	10	5
E	7	2
F	0	3
G	2	5
H	8	9
I	2	8

Answer

Assuming a job is never reworked more than once in the same rework loop.

a) *Calculate the average cycle time.*

$$CT = T_A + (1+0.2)(T_B+T_C) + T_D + \max\{T_E, T_F, T_G\} + 0.9(T_H) + T_I$$

The activity time = Processing time + Waiting time

$$\Rightarrow CT = 10 + 1.2(13+6) + 15 + \max\{9, 3, 7\} + 0.9(17) + 10 = 82.1 \text{ minutes}$$

b) *Calculate the cycle time efficiency.*

$$\text{Cycle time efficiency} = \frac{\text{Theoretical Process Cycle Time}}{\text{Actual Cycle Time}} = \frac{CT^*}{CT}$$

The theoretical cycle time (CT^*) is obtained by using the processing times instead of the activity times (i.e., by disregarding the waiting time).

$$CT^* = 3 + 1.2(8+2) + 5 + \max\{2, 3, 5\} + 0.9(9) + 8 = 41.1 \text{ minutes}$$

$$\Rightarrow \text{The Cycle Time Efficiency} = \frac{41.1}{82.1} \approx 50.1\%$$