HWA CHONG INSTITUTION
C2 PRELIMINARY EXAMINATION 2016

COMPUTING
Higher 2

19 September 2016   **Paper 2 (9597 / 02)**   **0815 -- 1115 hrs**

Answer *ALL* questions.
Begin *EACH QUESTION* on a *FRESH SHEET* of paper.

The maximum mark for this paper is 100.

1. Using the information in the table below, assuming that the project team will work a standard working week (5 working days in 1 week) and that all tasks will start as soon as possible:

Task	Description	Duration (Working Days)	Predecessor/s
A	Requirement Analysis	5	-
B	Systems Design	15	A
C	Programming	25	B
D	Telecoms	15	B
E	Hardware Installation	30	B
F	Integration	10	C, D
G	System Testing	10	E, F
H	Training/Support	5	G
I	Handover and Go-Live	5	H

(a) Draw a Program Evaluation and Review Technique (PERT) chart, show clearly the early start and late start time of each task, showing dummy tasks, where necessary.

[4]

(b) Explain the nature and purpose of a dummy activity.

[2]

(c) Explain dependent stages and concurrent stages, giving examples from your chart.

[2]

(d) State the critical path and the minimum time in which the project can be completed in weeks.

[2]

(e) Identify any non-critical tasks and the float (free slack) on each.

[2]

(f) Produce a Gantt chart based on the above information.

[2]

2. The owner of HC Book Café wishes to converts his book café into a self-service book club café for members only. All access to food or books is via a "vending machine" concept using the member's card.

There is a stock of 2000 different book titles and multiple copies of popular titles. Books may be hired by members. Different rates are charged for different books. Members are allowed to hire no more than 5 items at anytime.

Members can enjoy a light snack while viewing their favourite book. If the book is returned the same day via the book drop, hire charges are not incurred. All food and hire charges incurred for the month is billed to the member every 12th of the following month. Cash transaction is not available.

The shop owner wishes to computerize the system to handle the various transactions and stock control. The system should also perform the following functions:
- Hold up-to-date details of members and stock
- Allow enquiry to determine the whereabouts, and dates of return, of particular books
- Produce an itemized bill for each customer at end of each month.

(a) The system analyst of a software house was to design the computerized system. What documentation should the system analyst produce and state 5 necessary contents of the documentation? Who would use it and state 2 reasons for use.

[8]

(b) List the files, giving details of the fields which it may contain, that would be required for this system, and draw the data flow diagram of the computerized system.

[12]

(c) HC Book Café offers a member loyalty program that offers a range of discounts. For members in the loyalty program between 3 to 5 years, they will receive a 5% discount. For more than 5 years, the member will receive a 10% discount. However, whether a member is in the loyalty program or not, if the cumulative value of his transactions for this calendar year exceed $1000, he will receive a 15% discount. However, note that aggregation of discounts is not allowed.

(i) Create a decision table that shows all possible outcomes for the above loyalty program.

(ii) Draw the decision table after redundancies have been removed.

[5]

3   Given two positive integers M and N, the function GCD(M, N) is defined by

(i) If M < N, swap M and N
(ii) Divide M by N and let R be the remainder. If R = 0, N is the answer
(iii) Set M = N, N = R and go back to step (i)

Produce a recursive solution for GCD(M,N) using pseudocode. You may assume the availability of the operator MOD as in part (b).

[6]

4(a)   Explain what is meant by ASCII code and Unicode.

[4]

(b)   A number is stored as a one byte binary integer. How would the number 99 be represented as a one byte binary?

[2]

(c)   Convert the number 99 into hexadecimal.

[2]

(d)   Give two reasons why hexadecimal numbers are used in computing.

[2]

5(a)   Using the 3 design principle you have learnt in class to assess the interfaces between IOS and Android for mobile. Redraw and complete the table with your points. You may draw user interfaces to illustrate your point.

[15]

Design Principals	IOS	Android
Principal 1		
Principal 2		
Principal 3		

(b)   From the table above, draw a brief conclusion on the usability of the above platforms.

[3]

6. A relational database is to be used by the Human Resource department to recruit and register new students at the beginning of each year. Four tables present in the database are STUDENT, SCHOOL, GRADES, REGISTRATION.

   A brief description of the tables are as follow:
   • STUDENT table stores the demographic information of students
   • SCHOOL table stores information of the school they are currently studying
   • GRADES table stores information of the subjects and grades of the student in the previous year
   • REGISTRATION ties together all the relevant information of the students from other tables and their registration details

(a) Draw an E-R diagram to show the relationship between the four tables that provides for a fully normalized database design.

[6]

   A table description can be expressed as:
   Tablename[Attribute1, Attribute2, …..]

   The primary key is indicated by underlining one or more attributes.

(b) Give a table description for all the tables. Ensure there are at least 2 attributes in addition to the primary key.

[12]

7. Cloud computing is widely used in education to facilitate teaching and learning in classrooms.

(a) How is computing from the Cloud different from computing traditionally?

[2]

(b) What are the benefits of cloud computing?

[4]

(c) How can Cloud computing assist you as a student in project management?

[3]

~~~ End of Paper ~~~