

**UIT2201: Computer Science and Information Technology Revolution
(Spring Semester 2012)**

ANSWER KEY TO MID-TERM TEST

(NOT TO BE GIVEN TO FUTURE UIT2201 STUDENTS)

Fun Question: (1 bonus point) Enrico Fermi

Question 1: (20 points)

(a-f) F T T F F F **(g)** $\Theta(n)$, $\Theta(n \lg n)$, $\Theta(n^2)$, $\Theta(2^n)$ **(h)** search function **(i)** *many*

Question 2: (15 points)

(a) (6 points)

U-Count (T, 1, P, 4)	<u>4</u>	<u>0</u>
U-Count (T, 3, P, 4)	<u>1</u>	<u>3</u>
U-Count (T, 8, P, 3)	<u>2</u>	<u>1</u>

(b) (3 points)

Counts the number of mismatches between $P[1..m]$ and $T[k,k+m-1]$, component-wise.

(c) (2 points)

Dominant Operation: key comparison ($P[j] = T[k+j-1]$) [line 4]

(d) (4 points)

Time Complexity: $\Theta(m)$

Question 3: (15 points)

(a) [5] Search Tree (DIY)

(b) [4] Eve: 1 Cathy: 3 Bunny: 3 (unsuccessful) John: 4

(c) [3] $(1 + 2 + 2 + 3 + 3 + 3 + 3 + 4 + 4) / 9 = 25/9 = 2.78$

(d) [3] $(3 + 3 + 3 + 3 + 3 + 3 + 4 + 4 + 4 + 4) / 10 = 34/10 = 3.4$

Question 4: (10 points)

Given a database with the following 3 tables: {SI, CI, EN}. You should use these short table names to save space and writing. (Use the reverse blank pages, if necessary)

SI (STUDENT-INFO)						
Student-ID	Name	NRIC-No	Address	Tel-No	Faculty	Major
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CI (COURSE-INFO)					
Course-ID	Name	Day	Hour	Venue	Instructor
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EN (ENROLMENT)	
Student-ID	Course-ID
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(Note: In my answers, I use S-ID and C-ID for Student-ID and Course-ID.)

(a) [4 pts] List the **Course-ID, Day, Hour** of all courses taught in the venue "USP-SR1".

SQL Query: SELECT CI.C-ID, CI.Day, CI.Hour
FROM CI
WHERE (CI.Venue = "USP-SR1");

Using Basic Primitives:

A1 ← e-select from CI where (Venue = "USP-SR1");
Ans ← e-project C-ID, Day, Hour from A1;

(b) [6 pts] List the **Student-ID, Major** of FASS students who have classes in "USP-SR1".

SQL Query: SELECT SI.S-ID, SI.Major
FROM SI, CI, EN
WHERE (SI.Faculty = "FASS") AND
(CI.Venue = "USP-SR1") AND
(SI.S-ID = EN.S-ID) AND
(CI.C-ID = EN.C-ID);

Using Basic Primitives:

B1 ← e-select from CI where (Venue = "USP-SR1");
B2 ← e-select from SI where (Faculty = "FASS");
B3 ← e-join B1 and EN where (B1.C-ID = EN.C-ID);
B4 ← e-join B2 and B3 where (B2.S-ID = B3.S-ID);
Ans ← e-project SI.S-ID, SI.Major from B4;

~~~ END OF QUIZ ~~~