EGCO351 Operating Systems (2/2561)

SO1. An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Passing criterion >= 50%

PI 1-1 Identify and formulate engineering problems

PI 1-2 Solve problems by applying mathematics and engineering knowledge

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SO2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

Passing criterion >= 50%

PI 2-1 Produce a design that meet a set of requirements, needs, and constraints

PI 2-2 Apply appropriately existing solutions

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PI 1-1 Identify and formulate engineering problems

Midterm Exam

(8 marks) Q6 บนระบบคอมพิวเตอร์ที่มี 1 computation core เมื่อเกิด page fault ขึ้น process ที่ทำให้เกิด page fault จะถูก block ระหว่างที่รอให้ page ที่ต้องการ ถูกนำจาก disk เข้ามาไว้ใน physical memory สมมติให้ process มี user-level thread จำนวน 5 threads และการ map ระหว่าง user thread ไปยัง kernel thread เป็นแบบ many to one หากมี user thread ของ process ดังกล่าวทำให้เกิด page fault ขึ้น thread ที่เหลือจะสามารถทำงานต่อระหว่างที่รอให้ page ที่ต้องการ ถูกนำเข้ามาใน physical memory หรือไม่ จงอธิบาย

PI 1-2 Solve problems by applying mathematics and engineering knowledge

Final Exam

(12 Marks) Q2 กำหนดให้ใช้ deadlock avoidance algorithm, ณ เวลา to ระบบอยู่ในสภาวะดังต่อไปนี้:

	Allocation	**Max**	**Available**
	A B C D	**A B C D**	**A B C D**
P0	2 3 0 2	3 3 3 3	0 1 3 3
P1	0 2 0 2	2 4 5 2	
P2	2 1 1 0	3 1 1 5	
P3	0 0 2 2	5 0 4 6	
P4	1 1 2 1	1 2 3 4	

(ก) (6 คะแนน) จงพิสูจน์ว่าระบบอยู่ใน safe state หรือไม่ อย่างไร

(ข) (6 คะแนน) หาก P3 ร้องขอ (0,0,1,1) ระบบควรจะ allocate การใช้ resources ตามที่ร้องขอในทันทีหรือไม่ เพราะเหตุใด

PI 2-1 Produce a design that meet a set of requirements, needs, and constraints

Midterm Exam

(8 marks) Q4 What you think is/are the major reason(s) the multilevel queue CPU scheduler usually has different time quanta at different levels.

PI 2-2 Apply appropriately existing solutions

Midterm Exam

(14 Marks) Q12 Bakery algorithm given below can be used to synchronize n processes running on a 1-core CPU. Explain role(s) of for loop of the algorithm.

(a) common data structures

```
var choosing : array [0..n-1] of Boolean        //initialized to 'False'
    number : array [0..n-1] of integer          //initialized to '0'
```

(b)

- (a, b) $<$ (c, d) if (a $<$ c) or if (a = c) and (b $<$ d)
- max(a_0, ..., a_{n-1}) is a number, k, such that k $\geq$ a_i for i = 0, 1, ... n-1

(c)

code of Process Pi

```
repeat
    choosing[ i ] := true;
    number[ i ] := max (number[0], number[1], ... ,number[i-1]) + 1;
    choosing[ i ] := false;
    for j := 0 to n-1
        do begin
            while choosing[ j ] do no-op;
            while number[ j ] ≠ 0 and (number[ j ], j) < (number[ i ], i) do no-op;
        end;

            critical section

    number[ i ] := 0;

            remainder section

until false;
```

Entry Section

Exit Section

Student No	PI 1-1	PI 1-2	PI 2-1	PI 2-2
1	0	ขาดสอบ	0	0
2	0	1	1	0
3	ขาดสอบ	1	ขาดสอบ	ขาดสอบ
4	1	1	0	0
5	0	1	0	0
6	0	1	0	1
7	1	0	0	0
8	0	1	0	0
9	0	1	0	0
10	0	1	0	1
11	0	1	1	0
12	0	0	0	1
13	1	1	0	0
14	0	1	1	1
15	0	1	1	0
16	0	1	0	0
17	0	1	0	1
18	0	1	1	1
19	0	1	0	0
20	1	1	1	1
21	0	1	0	0
22	0	1	1	1
23	0	1	1	1
24	0	1	1	0
25	0	1	0	1
26	1	1	1	0
27	0	1	0	0
28	0	1	1	1
29	0	1	0	0
30	0	1	0	0
31	0	1	1	1
32	0	1	1	0
33	1	1	1	0
34	0	1	1	1
35	1	1	0	1
36	1	1	1	0
37	0	1	1	1

SO1. An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Passing criterion >= 50%

PI 1-1 Identify and formulate engineering problems

PI 1-1 Q.6: Attainability = 8/36 = 22.2% **Not Attainable**

PI 1-2 Solve problems by applying mathematics and engineering knowledge

PI 1-2 Q.2: Attainability = 34/36 = 94.4% **Attainable**

SO1 Conclusion

PI	Attainability	Reason	Remedial Action	Action plan	Measurements
1-1	✘	Do not understand the relationship between multithread and multicore when combined.	Provide more examples or use different examples.	Next semester	Next semester
1-2	✓				

SO2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

Passing criterion >= 50%

PI 2-1 Produce a design that meet a set of requirements, needs, and constraints

PI 2-1 Q.8: Attainability = 17/36 = 47.2% **Not Attainable**

PI 2-2 Apply appropriately existing solutions

PI 2-2 Q.12: Attainability = 15/36 = 41.7% **Not Attainable**

SO2 Conclusion

PI	Attainability	Reason	Remedial Action	Action plan	Measurements
2-1	✘	Do not understand main concept well enough.	Provide more examples or use different examples.	Next semester	Next semester
2-2	✘	Do not understand the working of algorithm.	Use different explanation method.	Next semester	Next semester