EASTERN MEDITERRANEAN UNIVERSITY

COMPUTER ENGINEERING DEPARTMENT

CMPE 412 – SOFTWARE ENGINEERING

Midterm Exam

13 April 2018

EXAM DURATION: 110 min

Std. ID_____Std Name_____

Instructor Alexander Chefranov

Totally 9 pages, 10 questions

QUESTION	GRADE
Q 1 (out of 5)	
Q 2 (out of 5)	
Q 3 (out of 5)	
Q 4 (out of 5)	
Q 5 (out of 5)	
Q 6 (out of 35)	
Q 7 (out of 5)	
Q 8 (out of 5)	
Q 9 (out of 5)	
Q 10 (out of 25)	
TOTAL	

Q1. (5 points) What are the main five responsibilities of a good software team leader?

Problem solving, Managerial identity
Achievement, Influence, Team building

Q2. (5 points) Specify one difference between Democratic Decentralized and Controlled Ccentralized software team organizations?

DD — no permanant leader, but for
CC there is a defined leader

Q3. (5 points) When Controlled Centralized software team organization is preferable?

When delivery date is strict

Q4. (5 points) Specify three main features of Extreme Programming practices

1) pair programming
2) Continuous integration
3) Continuous testing

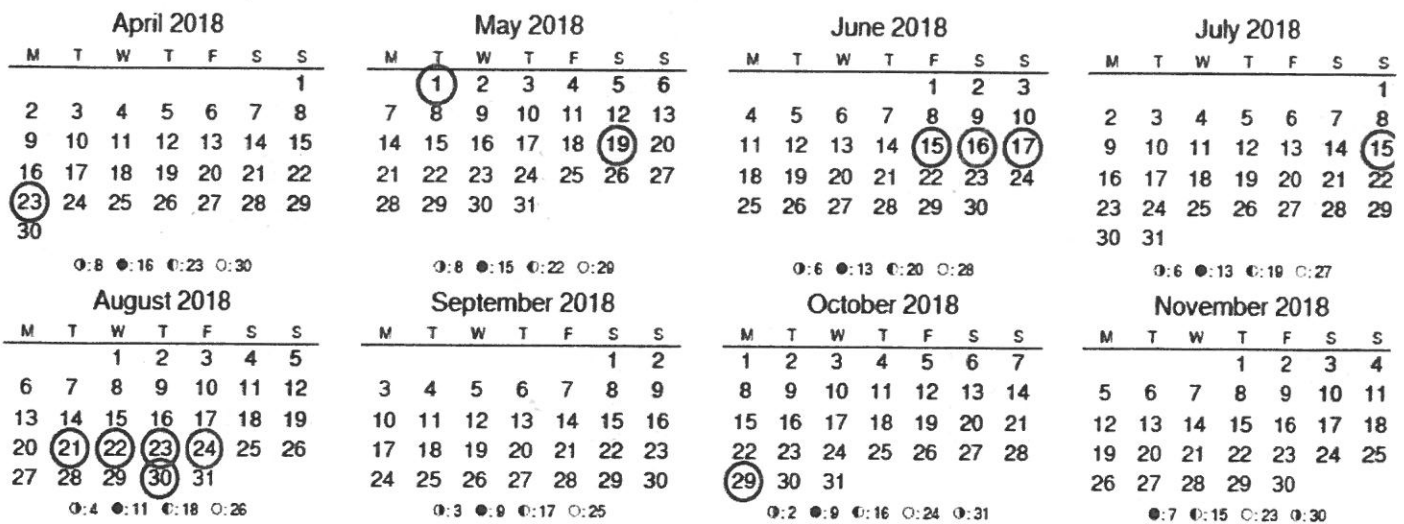**Q5. (5 points)** When the Random Paradigm in software team organization may be useful?

When innovation or technological
advance is required

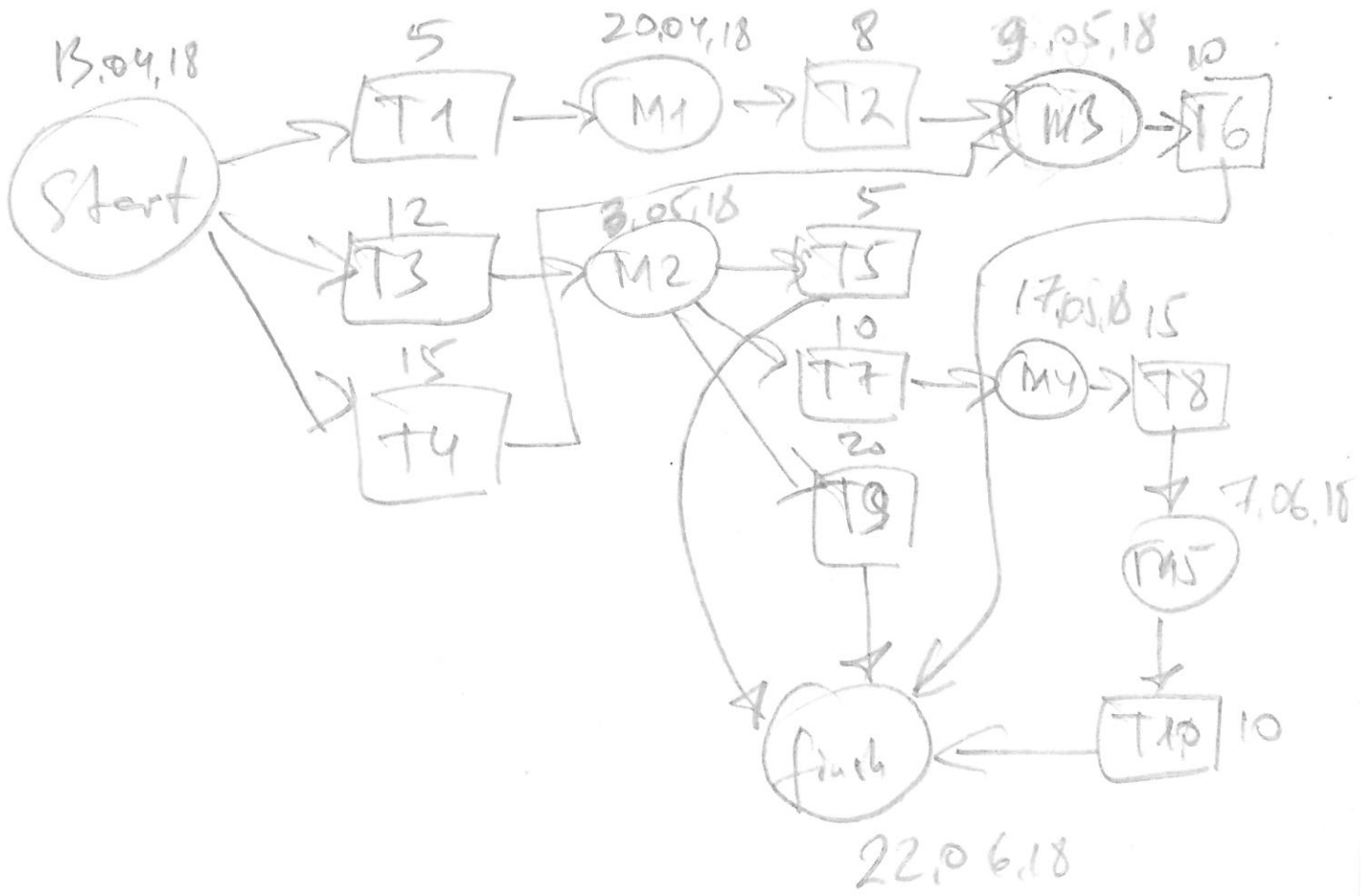**Q6. (25 points)** Consider the following set of tasks

Task	Duration (days)	Dependencies
T1	5	
T2	8	T1 M1
T3	12	
T4	15	
T5	5	T3 M2
T6	10	T2,T4 M3
T7	10	T3 M2
T8	15	T74 M4
T9	20	T3 M2
T10	10	T8 M5

Assume that the project shall start on April 13, 2018

HINT: Turkish calendar is as follows:

April 2018
M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
(23)	24	25	26	27	28	29
30						

◐:8 ●:16 ◑:23 ○:30

May 2018
M	T	W	T	F	S	S
(1)	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	(19)	20
21	22	23	24	25	26	27
28	29	30	31			

◐:8 ●:15 ◑:22 ○:29

June 2018
M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	(15)	(16)	(17)
18	19	20	21	22	23	24
25	26	27	28	29	30	

◐:6 ●:13 ◑:20 ○:28

July 2018
M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	(15)
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

◐:6 ●:13 ◑:19 ○:27

August 2018
M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	(21)	(22)	(23)	(24)	25	26
27	28	29	(30)	31		

◐:4 ●:11 ◑:18 ○:26

September 2018
M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

◐:3 ●:9 ◑:17 ○:25

October 2018
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
(29)	30	31				

◐:2 ●:9 ◑:16 ○:24 ◐:31

November 2018
M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

●:7 ◑:15 ○:23 ◐:30

a) (10 points) Draw activity network diagram

13.04.18

Start

5
T1

20.04.18
M1

8
T2

9.05.18
M3

10
T6

12
T3

3.05.18
M2

5
T5

15
T4

10
T7

17.05.18 15
M4

T8

20
T9

7.06.18
M5

T10 10

finish

22.06.18

4

b) (10 points) Specify all paths on the activity network diagram, find path lengths, <u>define the critical path and its length</u>

$P_1 = T_1, T_2, T_6 \rightarrow 23$

$P_2 = T_3, T_5 \rightarrow 17$

$P_3 = T_3, T_7, T_8, T_{10} \rightarrow 47$

$P_4 = T_3, T_9 \rightarrow 32$

$P_4 = T_4, T_6 \rightarrow 25$

critical path and its length

5

c) **(15 points)** Assuming thre staff members are available, Fred, Hasan, and Hiba, draw the schedule diagram, Gantt chart, showing task allocation to the staff

Q7. (5 points) What are the two main differences between V-Shaped and Waterfall models?

In V-shaped model contrary to Waterfall model
1) Test planning is made immediately after respective phase ending; 2) Level of concurrency is higher

Q8. (5 points) What are the two strengths of Rapid Application Development model ?

1) Lowers costs
2) minimizes risks of failure

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Q9. (5 points) What are the seven counts used for 3D points calculation ?

1) Inputs
2) Outputs
3) Inquiries
4) Internal files
5) External files
6) Transformations
7) State transitions

Q10. (25 points) Using COCOMO II Application composition model estimate effort of a project development with 10% reuse by a software team with Low developers' experience and Nominal CASE tools capabilities in which three screens, two reports, and one 3GL program component shall be developed. Each screen has two views and uses four database tables. Each report has four sections and uses five database tables. Provide details of your calculations, give necessary explanations.

Hints:

PM = (NAP * (1 - %reuse/100)) / PROD

Figure 26.8 Object-point productivity		Very low	Low	Nominal	High	Very high
Developer's experience and capability		Very low	Low	Nominal	High	Very high
CASE maturity and capability		Very low	Low	Nominal	High	Very high
PROD (NOP/month)		4	7	13	25	50

$$Prod = \frac{7+13}{2} = 10 \frac{HP}{p.m}$$

7

Object Point Analysis - Screen

	Number and source of data tables		
Number of views contained	Total < 4 (<2 server, <2 client)	Total < 8 (2-3 server, 3-5 client)	Total 8+ (>3 server, >5 client)
< 3	Simple	Simple	Medium
3 – 7	Simple	Medium	Difficult
8+	Medium	Difficult	Difficult

Object Point Analysis - Reports

	Number and source of data tables		
Number of sections contained	Total < 4 (<2 server, <2 client)	Total < 8 (2-3 server, 3-5 client)	Total 8+ (>3 server, >5 client)
< 2	Simple	Simple	Medium
2 or 3	Simple	Medium	Difficult
> 3	Medium	Difficult	Difficult

Object Point Analysis – Complexity Weighting

Type of object	Complexity		
	Simple	Medium	Difficult
Screen	1	2	3 → 3
Report	2	5	8 → 16
3GL component	N/A	N/A	10 → 10

3   2   1

$$NH = \boxed{29} \, AP$$

$$PM = 29 AP \left(1 - \frac{10}{100} \right) / 10 \, \frac{AP}{p.m}$$

$$= 2.9 \cdot 0.9 = 2.61 \, p.m$$