EASTERN MEDITERRANEAN UNIVERSITY

COMPUTER ENGINEERING DEPARTMENT

CMPE 412 – SOFTWARE ENGINEERING

Midterm Exam

12 April 2017

EXAM DURATION: 110 min

Std. ID_____Std Name_____ master-copy

Instructor Alexander Chefranov

Totally 9 pages, 8 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 25)	
Q 7 (out of 5)	
Q 8 (out of 45)	
TOTAL	

I. ESSAY QUESTIONS (totally 25 points)

Q1. (5 points) What are the main three activities for the software project management?

plan, monitor, control

Q2. (5 points) Specify two differences between Democratic Decentralized and Controlled Decentralized software team organizations?

Leader – DD(no), CD(yes)
Communication – DD(horizontal), CD(vertical)

Q3. (5 points) What risk analysis is? Why is it important? What is a contingency plan?

Analysis of potential threats on the timely project finishing. They may lead to project failure.
Contingency plan is a set of actions to be done if a threat actually is realized

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

pairwise programming, continuous testing, tiny increments

Q5. (5 points) What are six static workflows in Rational Unified Process? Why they are considered as static?

Business modelling, Requirements specification, design, development, testing, transition

They are considered static as being performed during the project development time

II. PROBLEM SOLVING QUESTIONS (75 pts)

Q6. (25 points) Compute the function point value FP for a project with the following information domain characteristics?

- Number of user inputs: 20
- Number of user outputs: 30
- Number of user inquiries: 15
- Number of files: 5
- Number of external interfaces: 4

$\sum(F_i)$→Assume that all complexity adjustment values are "MODERATE". Explain your calculations.

HINTS: All ingredients necessary for FP calculation are given below

1) EI Table

FTR's	DATA ELEMENTS		
	1-4	5-15	> 15
0-1	Low	Low	Ave
2	Low	Ave	High
3 or more	Ave	High	High

Inputs = 20 > 15 ⇒ High
Files = 5 > 2

Shared EO and EQ Table

FTR's	DATA ELEMENTS		
	1-5	6-19	> 19
0-1	Low	Low	Ave
2-3	Low	Ave	High
> 3	Ave	High	High

EO = 30 > 19 ⇒ High
Files = 5 > 3

EQ = 15 ∈ [6,19]
Files = 5 > 3 ⇒ High

Values for transactions

Rating	VALUES		
	EO	EQ	EI
Low	4	3	3
Average	5	4	4
High	7	6	6

2) For both ILF's and EIF's the number of record element types and the number of data elements types are used to determine a ranking of low, average or high. A Record Element Type is a user recognizable subgroup of data elements within an ILF or EIF. A Data Element

Type (DET) is a unique user recognizable, non-recursive (non-repeating) field on an ILF or EIF.

RET's	DATA ELEMENTS		
	1-19	20 - 50	> 50
1	Low	Low	Ave
2-5	Low	Ave	High
> 5	Ave	High	High

Rating	Values	
	ILF	EIF
Low	7	5
Average	10	7
High	15	10

EIF = 4 ∈ [2,5]
Data Elements not known
assume 4 ∈ [1,19] → Low
ILF = 5 ∈ [2,5]
Data elements not known,
assume 5 ∈ [1,19] →
Low

3)

Type of Component	Complexity of Components			
	Low	Average	High	Total
External Inputs	x 3 =	x 4 =	x 6 =	120
External Outputs	x 4 =	x 5 =	x 7 =	210
External Inquiries	x 3 =	x 4 =	x 6 =	90
Internal Logical Files	x 7 =	x 10 =	x 15 =	35
External Interface Files	x 5 =	x 7 =	x 10 =	20
Total Number of Unadjusted Function Points				475
Multiplied Value Adjustment Factor				0.93
Total Adjusted Function Points				441.75

442

4) 0: No influence
1: Incidental
2: Moderate
3: Average
4: Significant
5. Essential

MODERATE = 2
0.65 + 14.2/100 =
= 0.65 + 0.28 = 0.93

5) FP = count-total x [0.65 + 0.01 x sum(Fi)]

Q7. (5 points) Calculate the KLOC according to the above computed FP function point (in Q6) for same project. Assume that C++ is used as a programming language for the project.

HINT: C++ LOC/FP converting factor is 64

KLOC = FP · coef / 1000 =

= 442 · 64 / 1000 =

28,272 KLOC =

= 28 KLOC

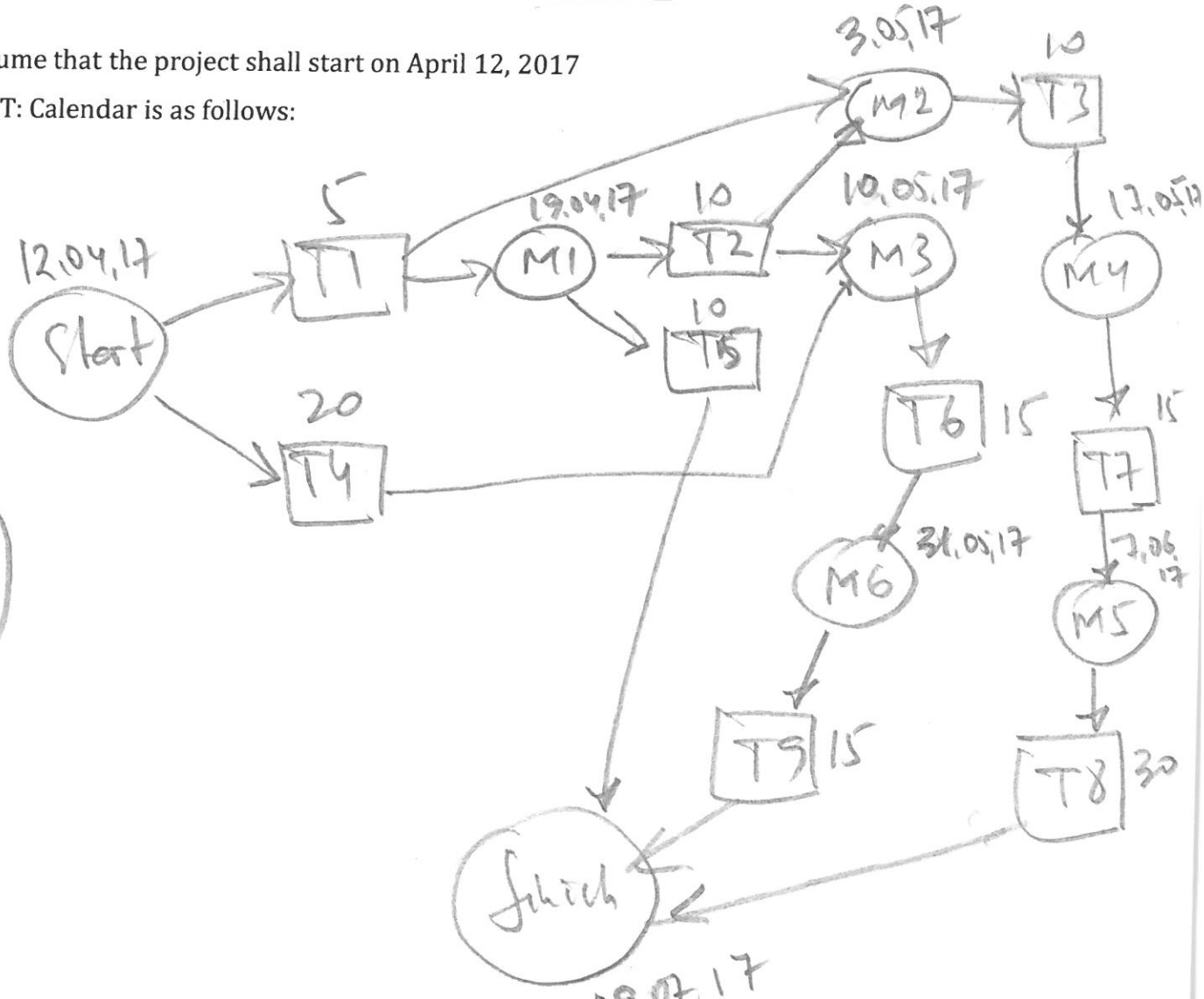
Q8. (45 points) Consider the following set of tasks

Task	Duration (days)	Dependencies
T1	5	
T2	10	T1 M1
T3	10	T1, T2 M2
T4	20	
T5	10	T1 M1
T6	15	T2,T4 M3
T7	15	T3 M4
T8	30	T7 M5
T9	15	T6 M6

Assume that the project shall start on April 12, 2017

HINT: Calendar is as follows:

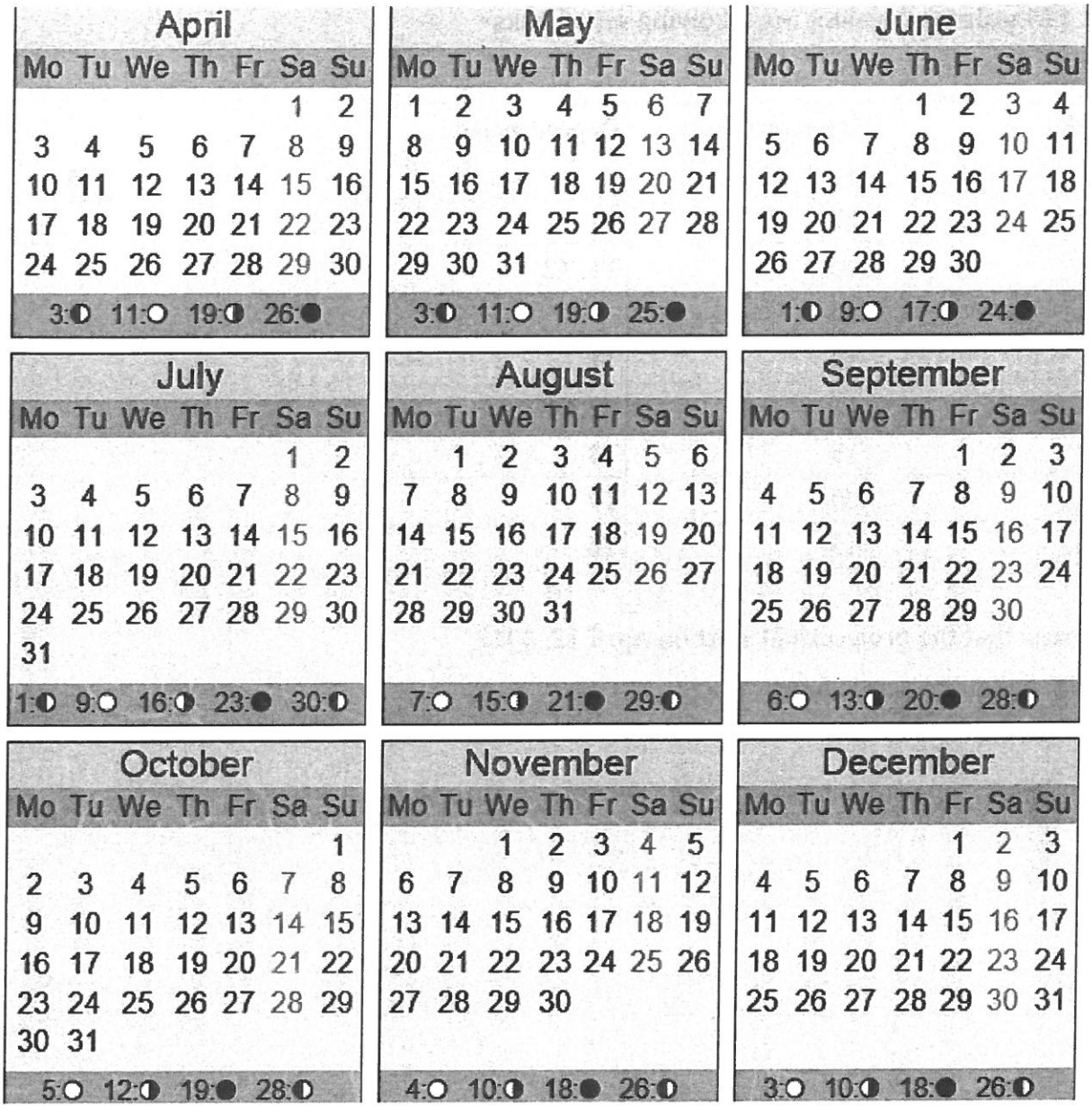
a)



b) P_1 = T1, T3, T7, T8, Length = 60

P_2 = T1, T2, T3, T7, T8, Length = 70

P_3 = T1, T2, T6, T9, Length = 45



April

Mo	Tu	We	Th	Fr	Sa	Su
					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:◐ 11:○ 19:◑ 26:●

May

Mo	Tu	We	Th	Fr	Sa	Su
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				

3:◐ 11:○ 19:◑ 25:●

June

Mo	Tu	We	Th	Fr	Sa	Su
			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		

1:◐ 9:○ 17:◑ 24:●

July

Mo	Tu	We	Th	Fr	Sa	Su
					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						

1:◐ 9:○ 16:◑ 23:● 30:◐

August

Mo	Tu	We	Th	Fr	Sa	Su
	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			

7:○ 15:◑ 21:● 29:◐

September

Mo	Tu	We	Th	Fr	Sa	Su
				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:◐

October

Mo	Tu	We	Th	Fr	Sa	Su
						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					

5:○ 12:◑ 19:● 28:◐

November

Mo	Tu	We	Th	Fr	Sa	Su
		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			

4:○ 10:◑ 18:● 26:◐

December

Mo	Tu	We	Th	Fr	Sa	Su
				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

3:○ 10:◑ 18:● 26:◐

a) (15 points) Draw activity network diagram

b) cont.

P_4 = T1, T5, length = 15

P_5 = T4, T6, T9, length = 50

critical path is P2, its length is 70

b) (15 points) Specify all paths on the activity network diagram, find path lengths, define the critical path and its length

c) **(15 points)** Assuming four staff members are available, John, Mary, Ekrem, and Ayshe, draw the schedule diagram, Gantt chart, showing task allocation to the staff