**Eastern Mediterranean University - Computer Engineering Department**

**Software Engineering Program**

**CMSE-201 Fundamentals of Software Engineering - Midterm Exam**

**Std Id\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Std Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Instructor: Prof. Dr. Alexander G. Chefranov**

**Duration: 110 Minutes April 16, 2022**

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**Three A4 sheets of paper with *your* *handwritings* (not photocopies, printouts, etc.) may be used for your help. Electronic devices are not allowed**

**There are 5 questions (totally, 100 points), 7 pages**

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| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total** |
| **Question** | **15** **(5,5,5)** | **15** **(5,5,5)** | **15** **(5,5,5)** | **15** **(5,5,5)** | **40** **(13, 13, 14)** | **100** |

**Good Luck!**

**Q1) 15 points** Introduction to software engineering

1. **5 points** What are the three key challenges software engineering facing?

Complexity of software products, requirements changing, and necessity to meet deadlines

1. **5 points** What software dependability and security is?

Dependability means that software reliably perform expected from it functions, and has not undeclared functionalities

Security means that only authorized people can get access to the system for reading and writing, and the system is available according to the agreement

1. **5 points** What are the eight ACM/IEEE ethical principles?

Public – obey laws, Client and employer – do not harm them, Product – provide high quality, Judgment – be independent, Management – be ethical, Profession – consistent with public interests, Colleagues – be fair, Self – life-long learning

Q2) **15 points** SW development model and processes

1. **5 points** What are the four characteristics of a software development process?

Activities, Product (outcome), Roles, Pre/post conditions

1. **5 points** What integration and configuration model is? Its benefits? Deficiencies?

The model is based on the existing components reusing by configuring them into the target system. Benefits: no need developing system parts from scratch, Deficiencies: some requirements may not be met because the components can’t fit them in full.

1. **5 points** What are the four design activities?

Architectural design, interface design, component design, database design

Q3) **15 points** Requirements engineering

1. **5 points** What are the five problems of requirements elicitation?

Stakeholders do not know what they really want; they express requirements in their own terms; requirements can conflict; external factors can affect requirements; requirements can change

1. **5 points** What are the five parts of a scenario description?

Pre-condition; normal success scenario; alternative scenarios; other concurrent activities; post condition

1. **5 points** What are the seven parts of a function description?

Name, inputs, outputs, data types used, algorithm, pre/post conditions, side effects

Q4) **15 points** Project management

1. **5 points** What are the five types of risks?

Risks: technological, organizational, people related, requirements related, and estimation related

1. **5 points** What are the three personality types?

People: task-oriented, interaction-oriented, and self-oriented

1. **5 points** What are the four factors affecting group communication?

Group size, group structure, group composition, environment

Q5) **40 points** Project planning and scheduling

The set of a project tasks is

|  |  |  |  |
| --- | --- | --- | --- |
| Task | Effort (person-day) | Duration (day) | Dependence |
| A | 6 | 4 |  |
| B | 5 | 5 | A(M1) |
| C | 3 | 6 | A(M1) |
| D | 4 | 4 | B(M2) |
| E | 3 | 3 | C(M3) |

**Assume that the project starts on April 18, 2022, Monday.** Calendar is



Taking into account actual weekends/holidays:

1. **13 points** Draw an activity network diagram with milestones and tasks, and define the earliest day of the project completion. Explain your answer.

A 4

B 5

C 6

D 4

E 3

22.04.2022

18.04.2022

5.05.2022

29.04.2022

10.05.2022

The earliest finish date is May 10, 2022. It is obtained by marking milestones by dates according to the calendar and tasks dependencies.

1. **13 points** Assuming that two software engineers, Abdul and Mary, are available, draw a staff allocation chart (schedule) for the project. Explain your answer.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 18.04 | 19.04 | 20.04 | 21.04 | 22.04 | 25.04 | 26.04 | 27.04 | 28.04 | 29.04 | 5.05 | 6.05 | 9.05 | 10.05 |
| Abdul | A | B | D |  |
| Mary | A |  |  | C | E |  |

The project ends by May 10, 2022.

1. **14 points** Draw an activity network diagram showing tasks only. For each task of the project, calculate Early start time, Early finish time, Late start time, Late finish time, and slack time. Explain your answer.

A 4

B 5

C 6

D 4

E 3

18.04;21.04

22.04;28.04

29.04;09.05

22.04;29.04

05.05;09.05

29.04;09.05

22.04;28.04

05.05;09.05

22.04;29.04

18.04;21.04

Early start and finish times are shown above the task boxes, and late start and finish times, below them. Since for all the tasks ES=EF and LS=LF, slacks of all the tasks are 0, hence all the tasks are critical.