# Software Engineering – 02GSP

Books or notes are **not** allowed.
Write only on these sheets. **Concise** and **readable** answers please.

Surname, name, matricola _____

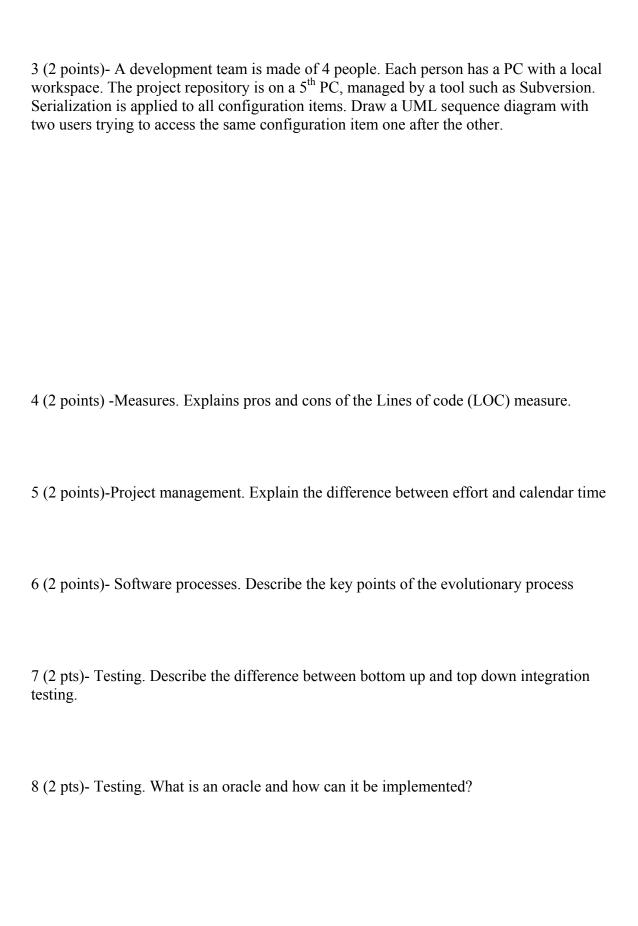1 (2 points) -Explain briefly the goal and activities of requirement engineering

2 (10 points) – a.  Model with a class diagram the following system: Vending Machine
A vending machine sells small, packaged, ready to eat items (chocolate bars, cookies, candies, etc). Each item has a price and a name. A customer can buy an item, using a smart card (issued by the vending machine company) to pay for it. No other payment forms (i.e. cash, credit card) are allowed.  The smart card records on it the amount of money available.
The functions supported by the system are:
- Sell an item (choose from a list of items, pay item, distribute item)
- Recharge the machine
- Set up the machine (define items sold, and price of items)
- Monitor the machine (number of items sold, number of items sold per type, total revenue)

The system can be used by a customer, a maintenance employee (who recharges items in the machine), an administrator (who sets up the machine).

2-b Enrich the model of the vending machine with use case diagram.

2-c Enrich the model of the vending machine with one scenario describing a successful sales procedure

Scenario name:
Precondition:

| Step | Description |
|------|-------------|
| 1 | |
| 2 | |
| | |
| | |
| | |

Postcondition:

2-d Enrich the model of the vending machine with one sequence diagram describing a successful sales procedure

3 (2 points)- A development team is made of 4 people. Each person has a PC with a local workspace. The project repository is on a 5<sup>th</sup> PC, managed by a tool such as Subversion. Serialization is applied to all configuration items. Draw a UML sequence diagram with two users trying to access the same configuration item one after the other.

4 (2 points) -Measures. Explains pros and cons of the Lines of code (LOC) measure.

5 (2 points)-Project management. Explain the difference between effort and calendar time

6 (2 points)- Software processes. Describe the key points of the evolutionary process

7 (2 pts)- Testing. Describe the difference between bottom up and top down integration testing.

8 (2 pts)- Testing. What is an oracle and how can it be implemented?

9 (9 points) -Define black box tests for the following function

       double movingAverage(int x)

receives an integer, returns the arithmetic average of the last 3 numbers received. An integer is considered only if > -100 and < 100. If outside these limits the value received is considered as a 0.
When less than 3 numbers have been received, the average is computed on the received ones.
To reset the status of the function, call void movingAverageReset();

Ex. movingAverage(1) → 1
    movingAverage(2) → 1.5
    movingAverage(3) → 2
    movingAverage(4) → 3
    movingAverage(110) → 7/3 = 2.33
    movingAverage(-110) → 4/3 = 1.33

| Criterion | Valid class | Invalid class | Boundary Condition |
|-----------|-------------|---------------|--------------------|
|           |             |               |                    |