Software Engineering – 02GSP

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

Surname, name, matricola ____

Multiplex cinema management.

A multiplex cinema is composed of several rooms, each room may show a different movie, with a different schedule. Each room has a specific seat capacity, to be strictly enforced for safety regulations. Each seat in a room has an id.

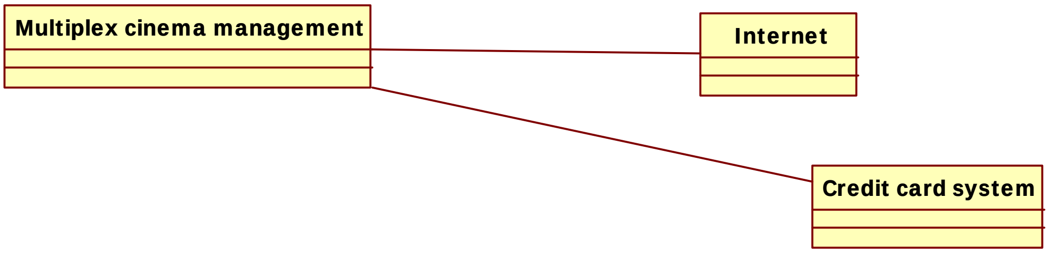
A management system for a multiplex cinema has to be built.

The management system will be used by clerks to sell tickets at a counter in the cinema. The sale of a ticket can also be done via Internet, the customers buys it connecting to a web site. A ticket is valid for a specific seat, in a specific room, for a specific show (movie and start time). A ticket is unique and has a bar code. The ticket must be printed to guarantee admission. A ticket is sold only in the same day of the show, and only if there is a seat available. The user can choose the seat. A ticket is refundable, if not used.

Another function of the system is admitting (or rejecting) people to the rooms. Admission is regulated by a gate, which opens after showing a valid ticket to a bar code reader. There is a first row of gates controlling access to all rooms, then a gate controlling access to each room.

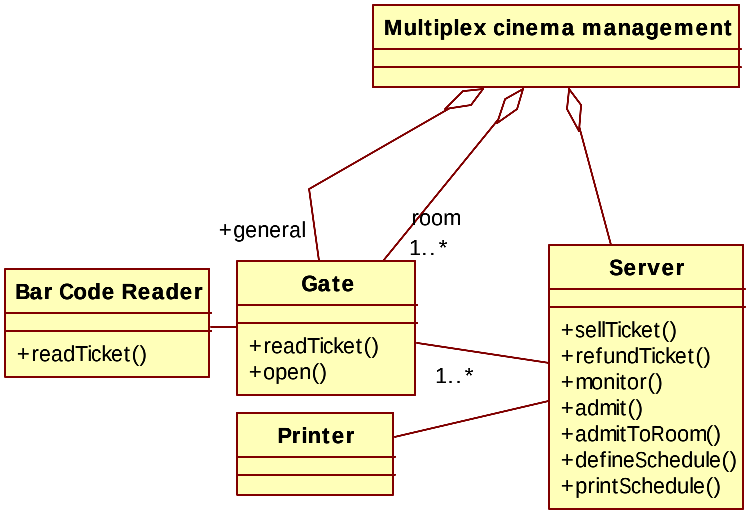
Other functions supported by the system are refund of a ticket; various monitor functions for the clerks (how many persons are in a room, how many seats available for a room/movie session, average occupation of a room per day/ per session); definition of the schedule for the day (what movie for what room at what time); printout of the schedule of the day.

1 (13 points) – a. Define the context diagram (including relevant interfaces)

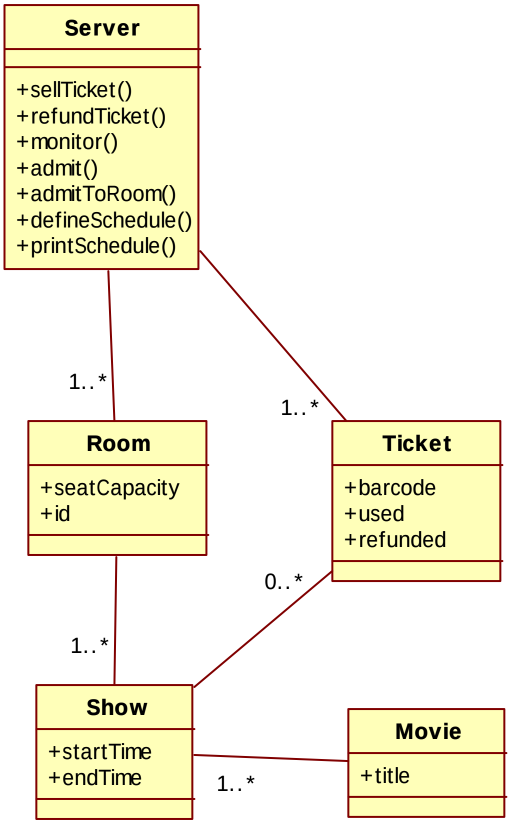


Interfaces are: an internet connection (so that customers can buy ticket) and a connection to a credit card system for payments

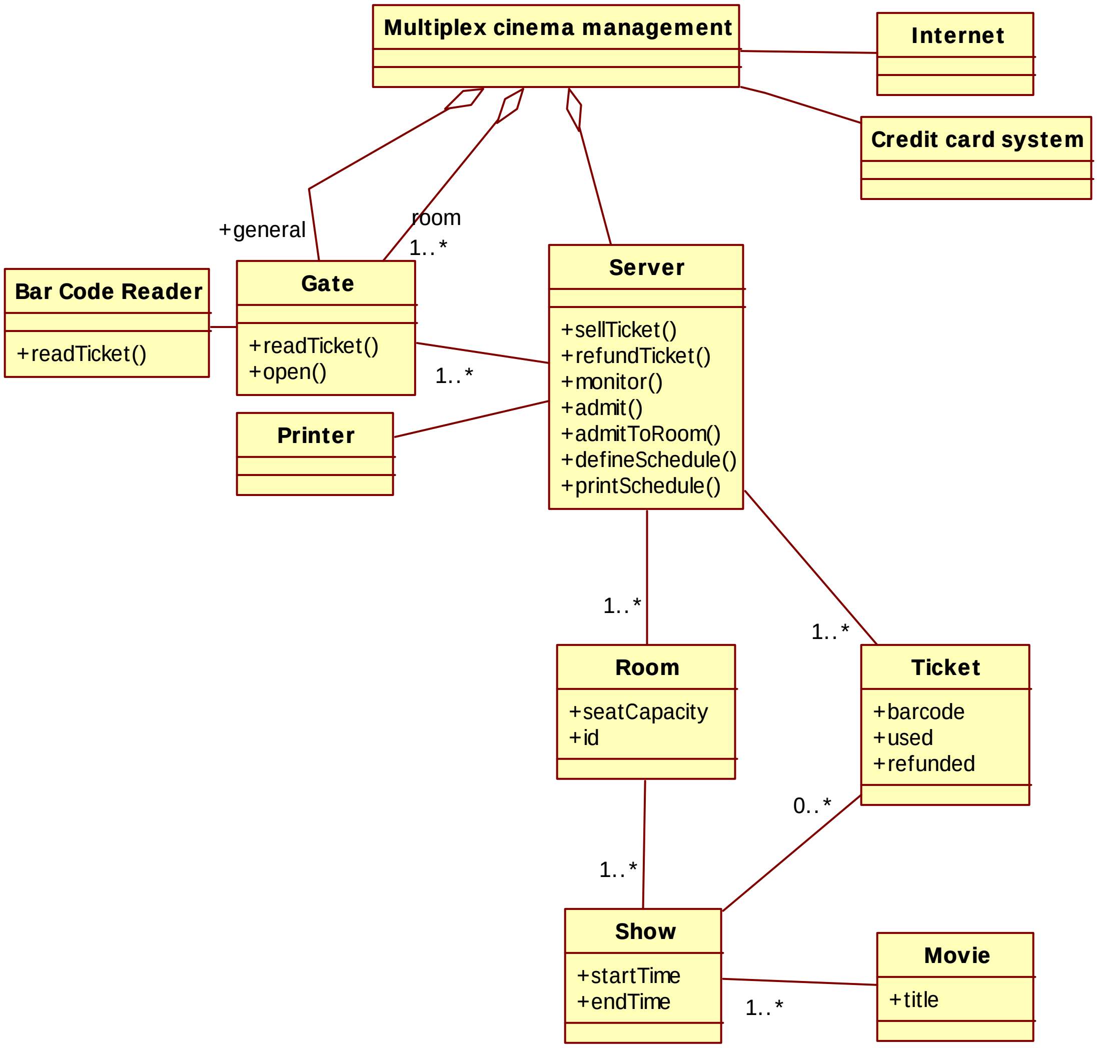
Define the system design



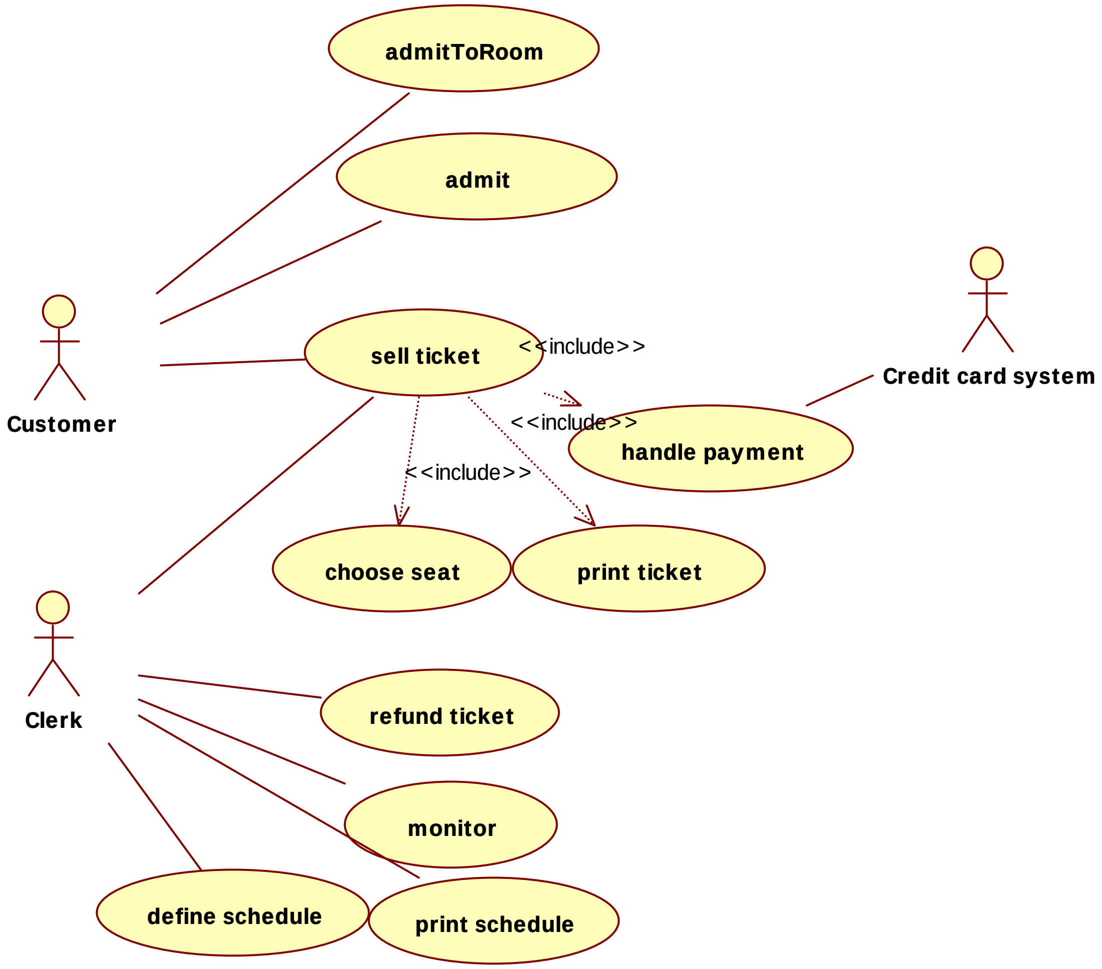
Define the class diagram.



Complete class diagram with all parts



Define the use case diagram



Define one scenario describing a successful sale for a ticket for a movie.
Precondition: at least one seat available for selected show
Postcondition: selected seat now occupied

Step	Description
1	Customer selects show
2	Customer selects seat
3	Customer pays
4	System sets the seat as occupied, decreases number of seats available

Define one scenario describing a successful admission to a room.
Precondition: customer has valid ticket for show and room
Postcondition: ticket is considered as used, seat as busy

Step	Description
1	Customer shows ticket at room gate
2	System checks if ticket is valid for show and room
3	Room gate opens, customer enters
4	System sets ticket as used, seat as occupied

2 (8 points) -Define black box tests for the following function

int twoCirclesIntersectionPoints(int radius1, int x1, int y1, int radius2, int x2, int y2);

The function receives the coordinates of two circles on a plane (as radius and position of the center). The function returns an integer considering the relative positions of the circles: 0 if they have no points in common, 1 if they have one point in common (tangent circles), 2 if they have two points in common (secant), 3 if they have all points in common.

Ex. twoCirclesIntersectionPoints(1, 0, 0, 1, 2, 0) → 1
Ex. twoCirclesIntersectionPoints(1, 0, 0, 1, 1, 0) → 2

Criterion	Valid class	Invalid class	Boundary Condition
Radius sign	positive	Negative	Zero maxint
X y sign	Positive, negative		Maxint, minint
Input parameters type	integer	All others (char, float, double ..)	
Points in common	Zero Zero and one circle is inside the other Zero and one circle is outside the other		
	One One and one circle inside the other One and one circle outside the other		
	Two		
	All in common (the 2 circles are the same circle)		

3 (6 points) – For the following function define the control flow graph, choose the best coverage achievable, and define test cases to obtain it

```
int max(int[] array){
 int max = MININT;
 for (int i = 0; i<array.length; i++)
    if (array[i] > max)
               max = array[i];
return max;
}
```

Coverage condition(s) selected: __edge coverage (this implies node coverage), loop coverage__
Path coverage is unfeasible, condition coverage is equivalent to edge coverage because the conditions have one term only.

4) (1 point) User Mario commits file A on a subversion server, subversion notifies that the file is at revision 300. User Mario and other users execute 3 more commits of other files. Then John commits again file A. What is the revision number of A?
304 on the repository and on John's working copy. (However, Mario's working copy is at 301, unless Mario updates)

5) (1 points) What are the key points of perspective based reading?
Like an inspection, but each reader reads the document from a different perspective, ex tester, designer, end user

6) (1 points) What is a milestone? Give an example of a milestone in a construction project.
A key event in the project, with possible effect on later activities. Ex, construction permit is granted.

7) (1 point) What are the key points of the Cocomo model?
The Cocomo model links effort (in person months) and size (in delivered source instructions). Three models are provided (for simple, intermediate and complex systems), but in all cases the relation is exponential. The Cocomo model was proposed by B Boehm in 81, and is now replaced by Cocomo2

8) (1 point) What are the key differences between testing and debugging?
Testing tries to find failures, debug tries to discover the correspondent fault(s)

9) (1 point) What states Weinberg's law in the context of testing?
The one who develops an artifact (notably code) is not suitable to test it