SEG 2105 - LECTURE XX

MIDTERM SOLUTION

MULTIPLE CHOICE

THE ANSWER

SO CLOSE

~~NOT REALLY~~

~~VERY INCORRECT~~

1. An email client such as Thunderbird, where users can access and send emails and consult a calendar in their preferred OS (Thunderbird is cross-platform), is a _____ client application.

A. Thin

B. Fat

C. Horizontal

D. Peer-to-Peer

E. Multi-threaded

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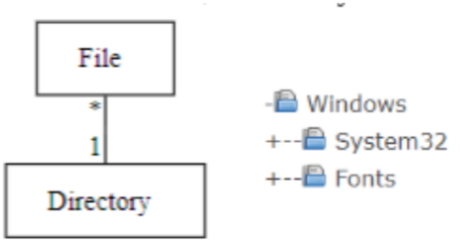

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B. A symmetric reflexive association (in class Directory)

C. An asymmetric reflexive association (in class Directory)

D. An attribute ‘subdirectory’ in class Directory.

E. Multiple subclasses for class Directory

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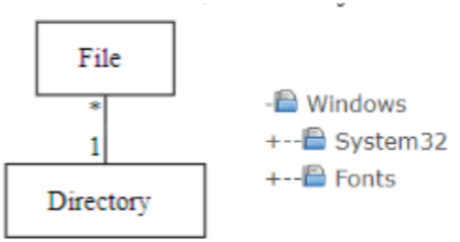

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3. Which of the following statements is false in the context of object (instance) diagrams?

A. An object diagram can only contain links generated by associations

B. The number of links among instances are consistent with the multiplicity of the class diagram

C. A class diagram can generate an infinite number of object diagrams

D. Associations in the object diagram must include a multiplicity

E. An object diagram shows a configuration of objects and links that exist at run-time

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4. Which of the following associations can generate the code in the figures below?

```
public class A {
  private B b ;
  public A(){}
  //More Code omitted
}
```

```
public class B {
  private A a;
  public B(A aA) {
    boolean didAddA = setA(aA);
    if (!didAddA) {
      throw new Exception("Unable to create instance");
    }
  }
  //More Code omitted
}
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A. A 0..1-*B

B. A 1-0..1B

C. A 1-*B

D. A 1-1B

E. None of the above

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~~A. A 0..1 - * B~~

B. A 1 - 0..1 B

~~C. A 1 - * B~~

D. A 1 - 1 B

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5. A server socket differs from a regular socket because:

A. The server socket waits for messages from a connected client

B. The server socket waits for messages from a connected server

C. The server socket waits for new connections

D. The server socket can have an input or output stream attached to it

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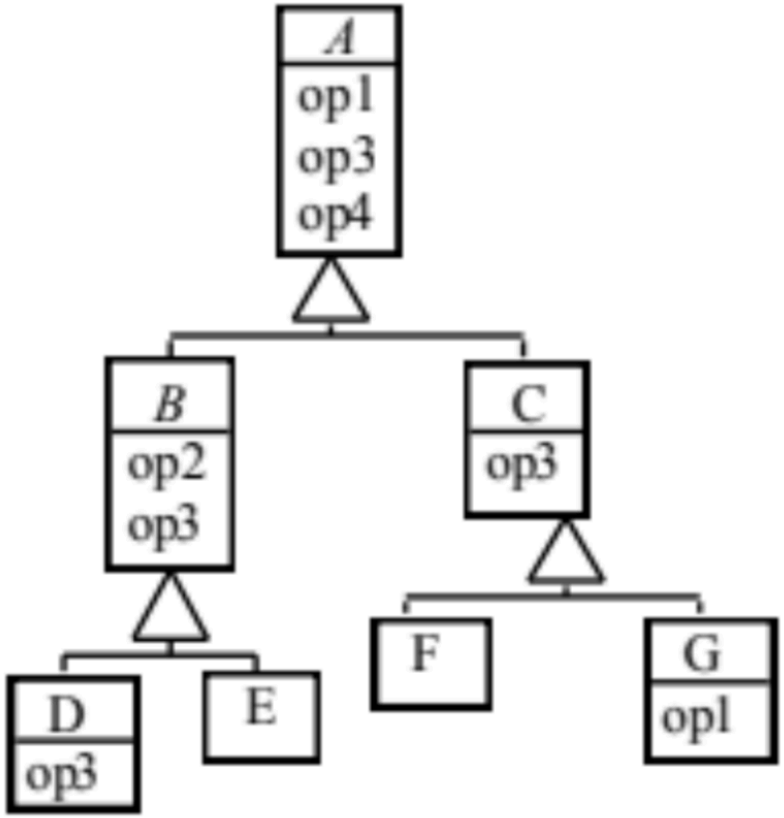

A. op1

B. op2

C. op3

D. op2 and op3

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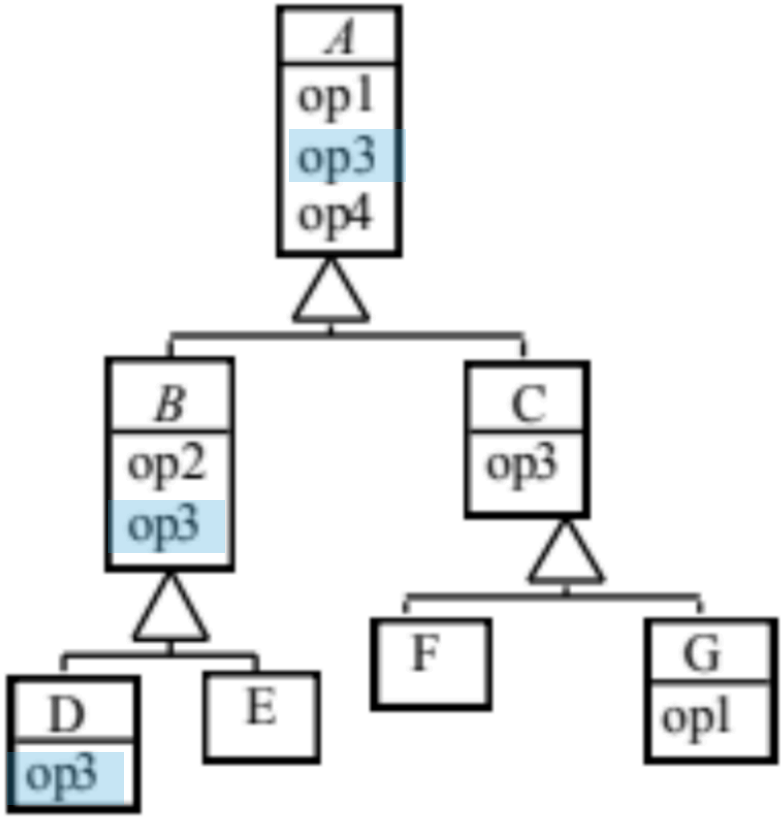

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A. The subordinates in an organization chart

B. Your friends in Facebook

C. Your cousins

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A. Usability

B. Efficiency

C. Reliability

D. Maintainability

E. Reusability

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9. In SimpleChat, what is the purpose of ChatIF?

A. It allows flexibility to communicate with a different server without changing the ChatClient code

B. It is where the code for the user interface can be found

C. It is abstract class allowing you to have several concrete UI classes

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10. Which type of UML models contains elements that might not be in the domain, but are needed to build a complete system?

A. Exploratory Domain Model

B. System Domain Model

C. System Model

D. Use Case Diagram

E. OCL Model

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B. Associations

C. Operations

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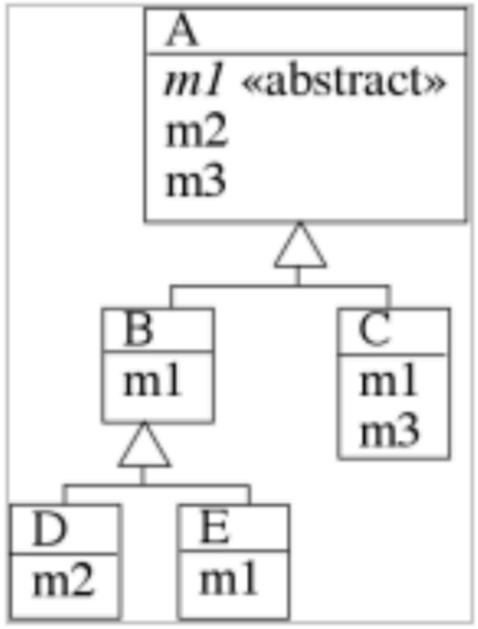

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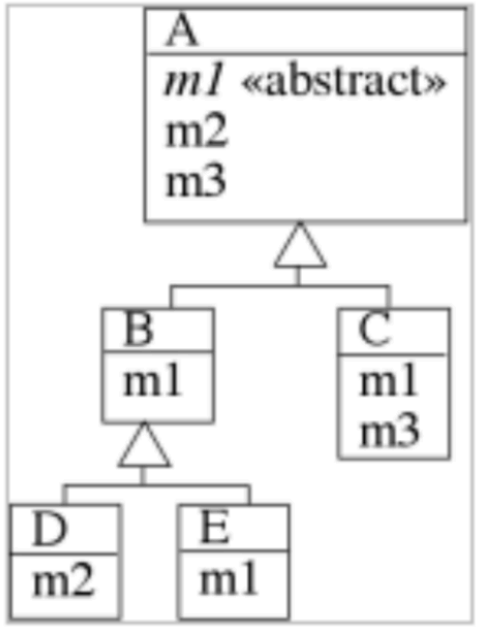

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14. Which of the following is a special kind of association?

A. A link

B. A generalization

C. A composition

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15. Which of the following is false about interfaces in Java?

A. An interface in the Java programming language is an abstract type that is used to specify a behavior that classes must implement.

B. A class in Java can implement multiple interfaces.

C. Interfaces in Java 9 can now have default methods with a method implementation.

D. Interfaces in Java (any JDK version) can be instantiated.

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16 (ver 2). Which of the following statements is true about instance variables

A. Instance variables across different objects may have different values

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C. In Java, they are also called static variables

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17. What should the multiplicities between the classes Person and Concert be? A Concert must have at least one spectator (person), and a person can attend many Concerts.

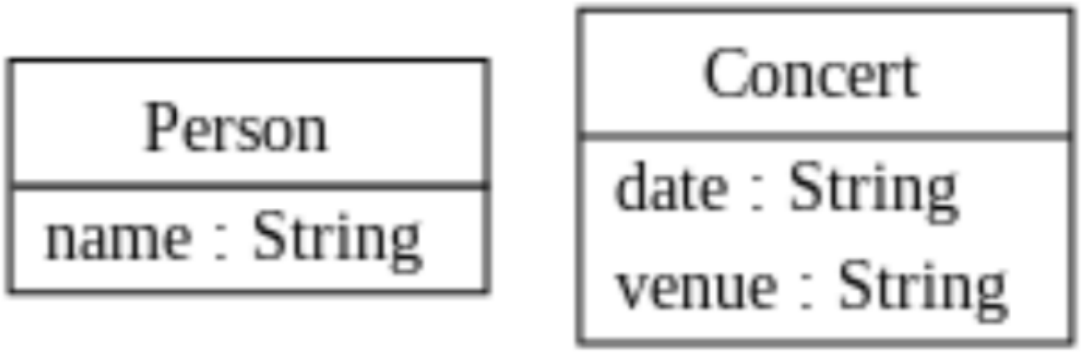
A. 0..1 to 0..1

B. 0..* to 1

C. 0..* to 0..*

D. 0..* to 1..*

E. 1..* to 0..*



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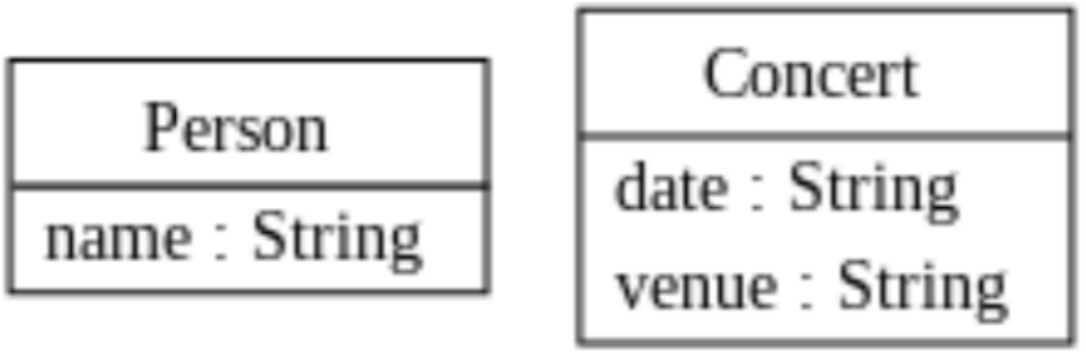

18. If I wanted to add the ability to sell tickets to a Person in order to attend a concert, what would be the best way to do it? We want also to record the ticket number and price paid.

A. Add attributes ticketNumber and unitPrice to the Person Class.

B. Add attributes ticketNumber and unitPrice to the Concert Class.

C. Create a class Ticket with attributes ticketNumber and unitPrice and associate it with class Concert in a many-to-one association.

D. Create an association class Ticket with attributes ticketNumber and unitPrice.

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19. Consider the following code snippet. Which of the following statements is false?

A. This third handler catches exceptions of type Exception; therefore, it catches any exception.

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try {

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20. Which of the following statements is false?

A. In the code snippet above, the value printed will be 87.

B. The code above will throw a ClassCastException.

C. Casting an object from a sub-class to a super class doesn't require an explicit cast.

D. Casting an object from a super class to a sub class requires an explicit cast.

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SYSTEM MODELLING

SOME VARIATIONS, GRADED LOOSELY

21. (22 marks) Create a UML class diagram for the system below.

- Show all attributes (data types are NOT required),
- Show all associations and generalizations.
- Make sure you include the correct multiplicity.
- Methods and access modifiers are not required and will NOT be graded.

SEG 2105 Lecture XX - Midterm Solution

System specification: Online Application System for Undergraduate Programs

You work as a software engineer at a university. The administration wants to build a system for managing applications to the undergraduate programs and you are required to design a UML Class Diagram for the proposed system.

The system should receive applications from people interested in joining a specific program. Each program has a maximum capacity of accepted students, a minimum grade point average for acceptance, and a number of required recommendation letters. For each program, there is an administrative officer (responsible for checking applications for completeness), and an academic officer (responsible for making decisions on applications). Interested applicants would submit their applications to a specific program. Each application contains information about the applicant name, contact information (email, phone number, and address), in addition to other information relating to the applicant's status (international or domestic student) and additional documents required by the program.

When submitting the application, the applicants must pay an application fee (different for each program). The accepted method of payment is using a credit card. The system must store the payment information including the selected payment method, payment date, credit card information (name of card holder and card number only). The system should keep track of the application status (checking completeness, under academic review, accepted, rejected and waiting list).

Finally, scholarships are offered by different programs for highly qualified candidates. A scholarship is for a specific amount of money and is given for a set number of terms.

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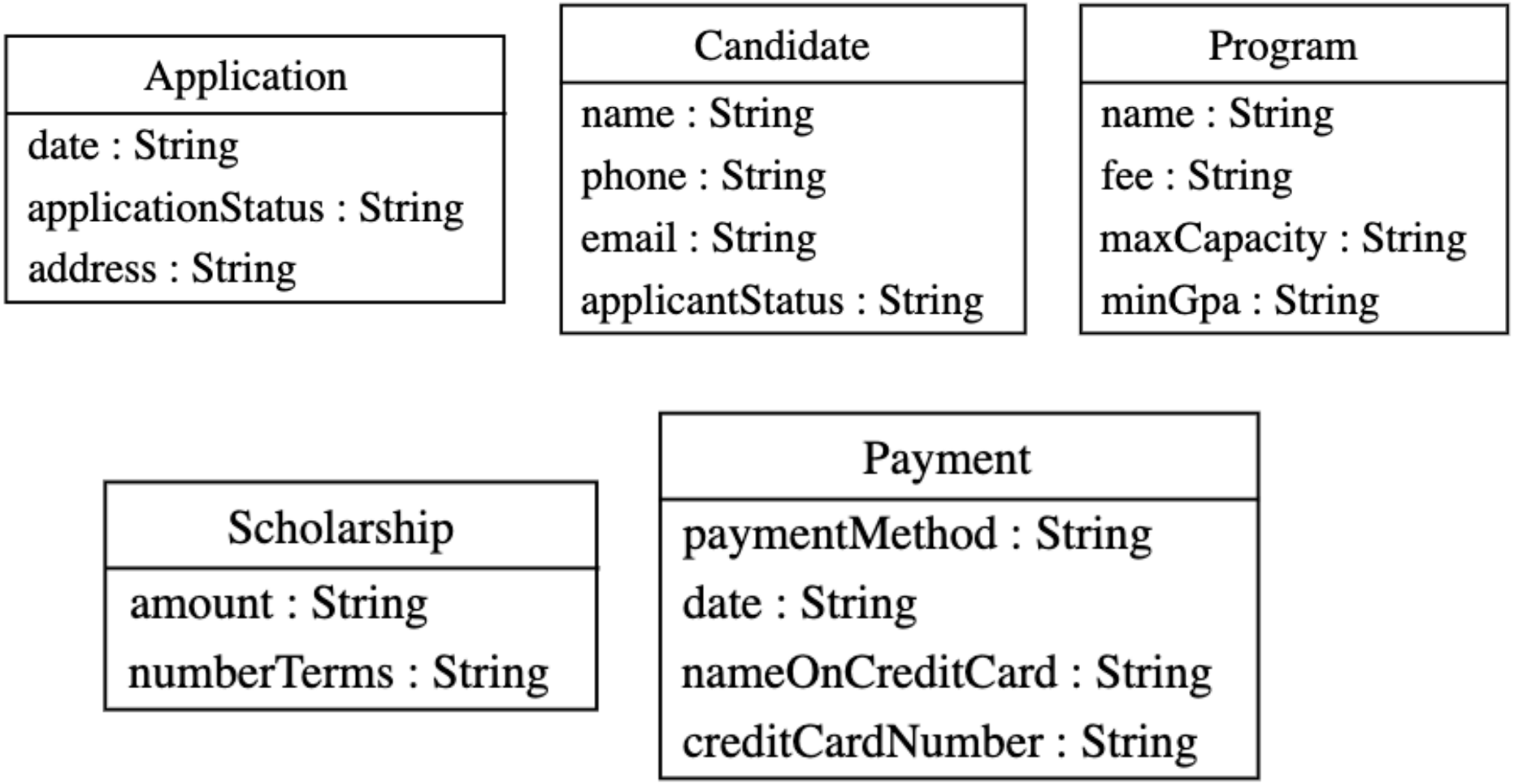
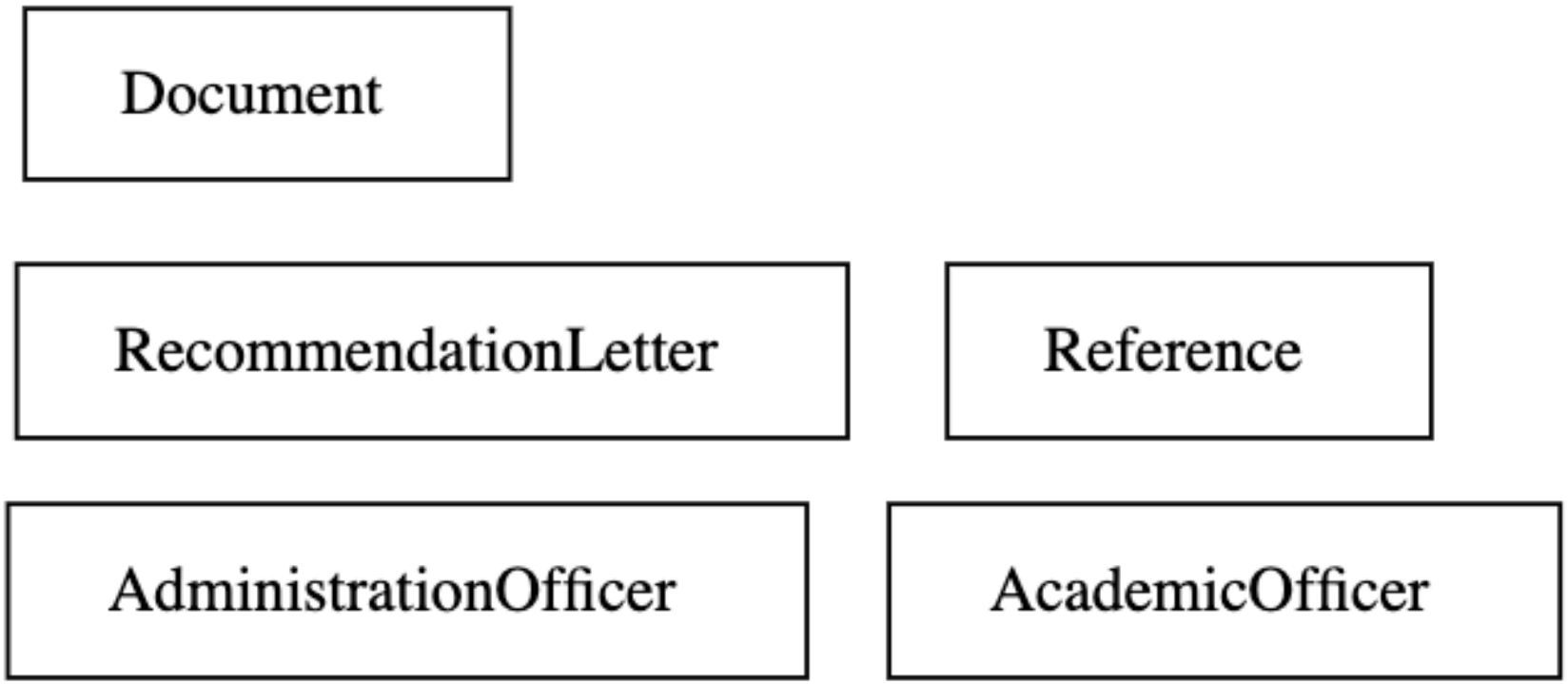
IDENTIFY CLASSES AND ATTRIBUTES



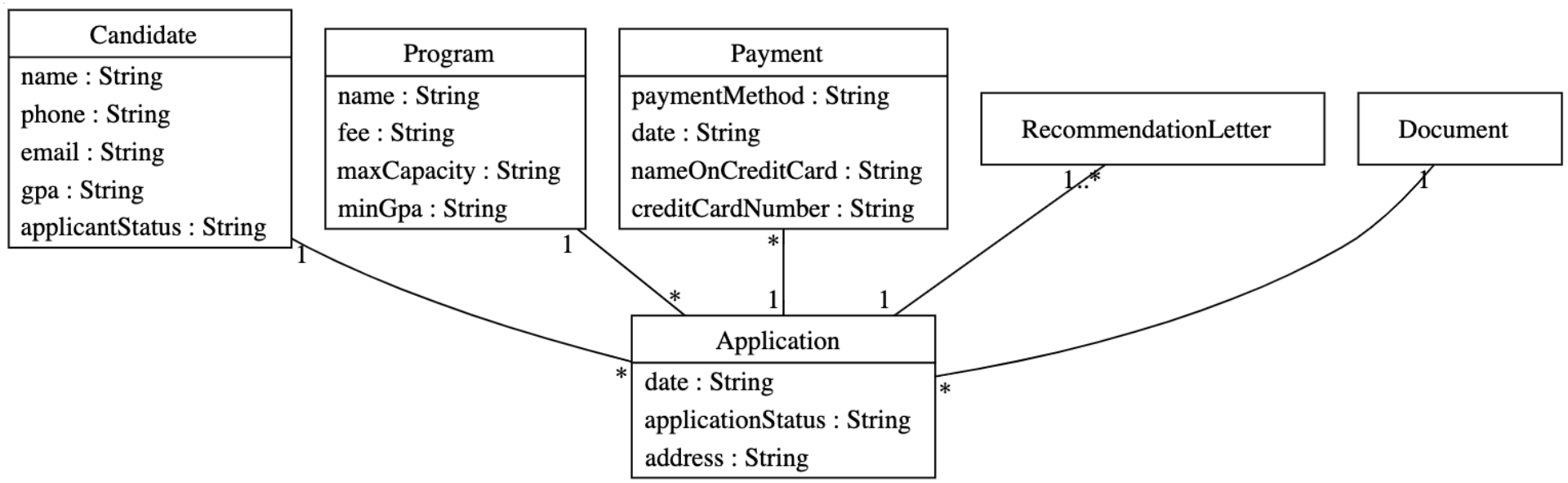
Other classes



RELATIONSHIPS (ASSOCIATIONS)

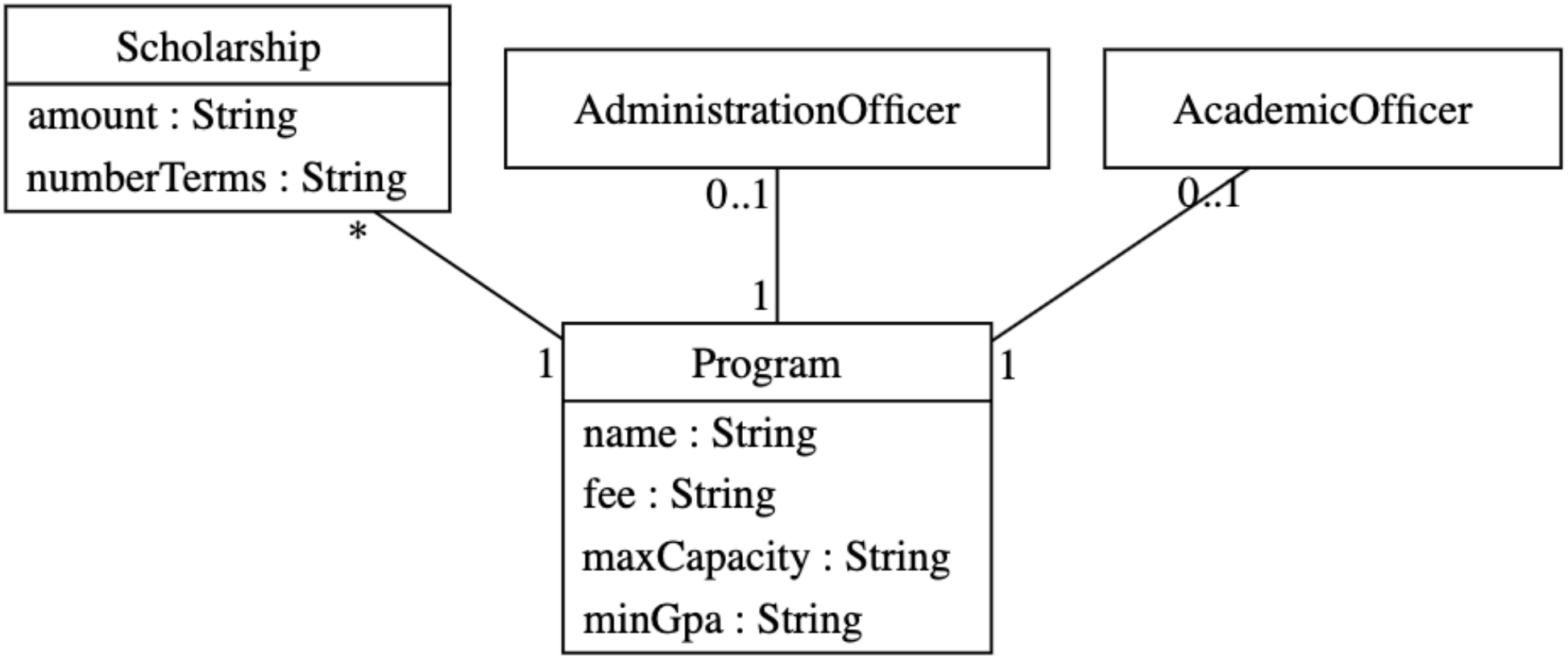
```
class Application {
  date;
  applicationStatus;
  address;

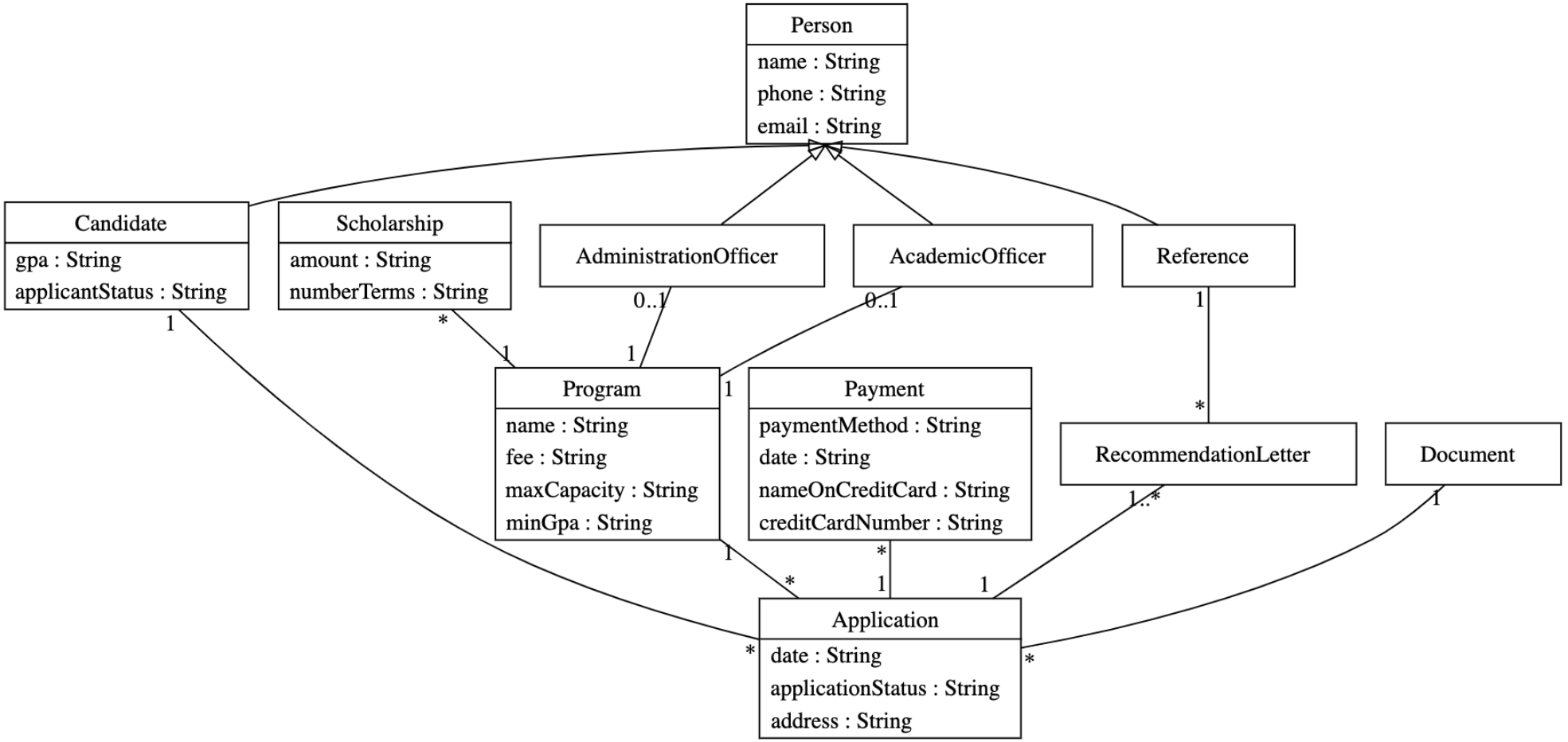
  * -- 1 Candidate;
  * -- 1 Document;
  1 -- * Payment;
  1 -- 1..* RecommendationLetter;
  * -- 1 Program;
}
```


Candidate
name : String
phone : String
email : String
gpa : String
applicantStatus : String
Program
name : String
fee : String
maxCapacity : String
minGpa : String
Payment
paymentMethod : String
date : String
nameOnCreditCard : String
creditCardNumber : String
RecommendationLetter
Document
Application
date : String
applicationStatus : String
address : String
1
1
*
1
1..*
1
*
*
*
*
*

OTHER RELATIONSHIPS

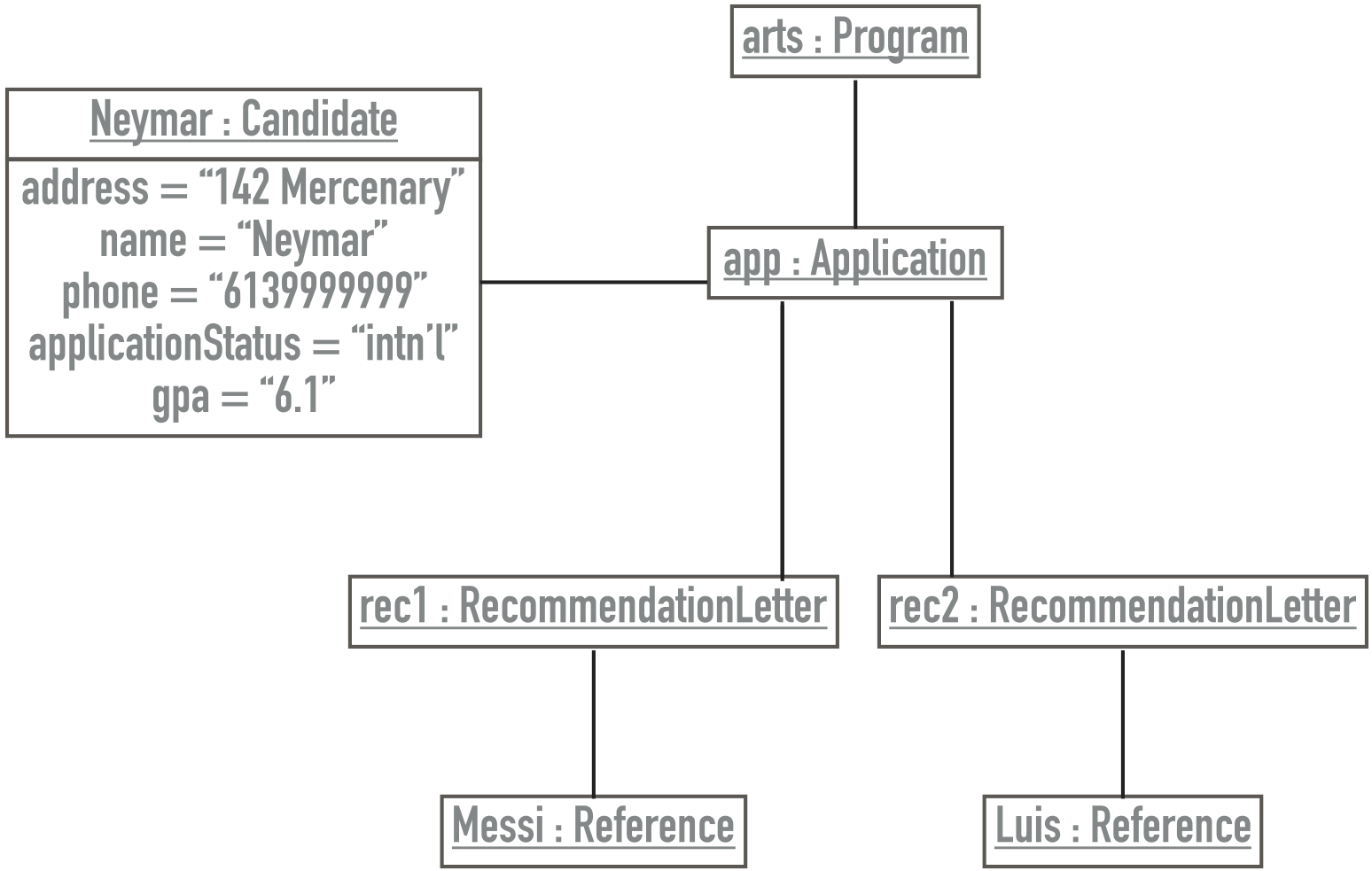
```
class Program {
  name;
  fee;
  maxCapacity;
  minGpa;
  1 -- 0..1 AdministrationOfficer;
  1 -- 0..1 AcademicOfficer;
  1 -- * Scholarship;
}
```


Scholarship
amount : String
numberTerms : String
AdministrationOfficer
AcademicOfficer
0..1
0..1
*
1
1
1
Program
name : String
fee : String
maxCapacity : String
minGpa : String


Person
name : String
phone : String
email : String
Candidate
gpa : String
applicantStatus : String
Scholarship
amount : String
numberTerms : String
AdministrationOfficer
AcademicOfficer
Reference
Program
name : String
fee : String
maxCapacity : String
minGpa : String
Payment
paymentMethod : String
date : String
nameOnCreditCard : String
creditCardNumber : String
RecommendationLetter
Document
Application
date : String
applicationStatus : String
address : String
0..1
0..1
1
*
1
1
1
*
1
*
1..*
1
1
*
1
*
1
*
*

22. (8 marks) (8 marks) Draw an UML object diagram consisting of the following:

- The international Student Neymar with phone number 613-9999999 living at 142 Mercenary st, has applied to the Fine Arts in Acting program offered at the University of Ottawa. Neymar has a CGPA of 6.1. This program has a minimun required GPA of 6.0 and two recommendation letters. Along with the application information, Neymar joined two recommendation letters from previous colleagues (Messi and Luis).
- Initialize all required attributes and show all necessary links.
- Your instance diagram needs to be consistent with the class diagram you developed.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Neymar : Candidate
address = "142 Mercenary"
name = "Neymar"
phone = "6139999999"
applicationStatus = "intn'l"
gpa = "6.1"
app : Application
rec1 : RecommendationLetter
rec2 : RecommendationLetter
Messi : Reference
Luis : Reference