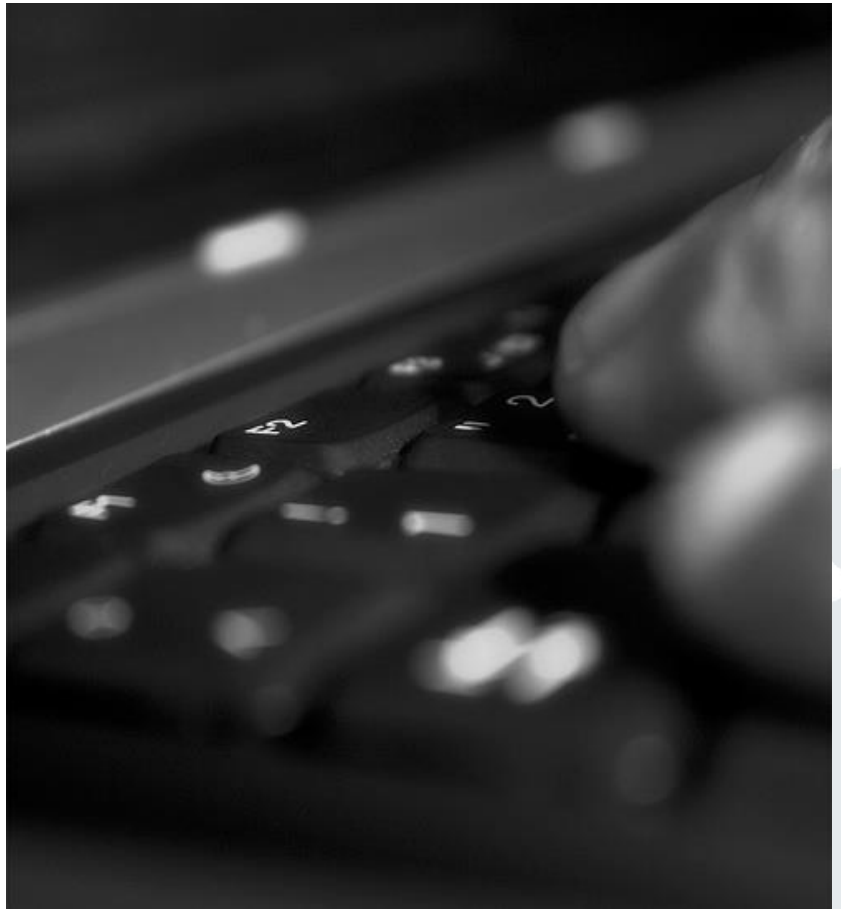


Mentorium 5  
Business Informatics 2 (PWIN)

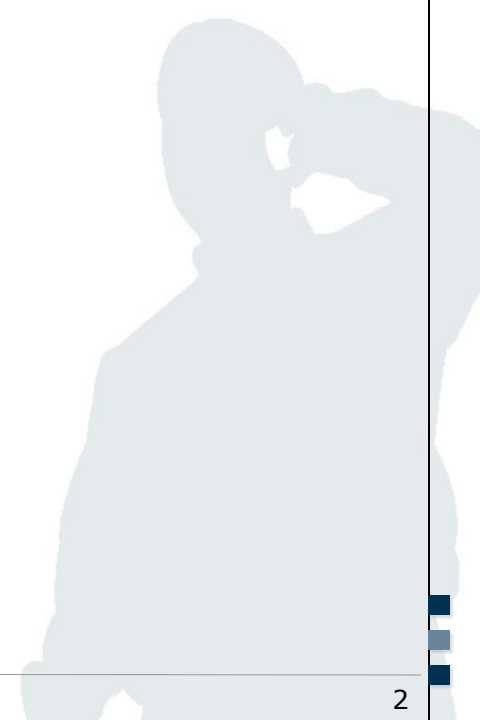
Management of IT Projects &  
Software Engineering

[www.m-chair.de](http://www.m-chair.de)



Jenser (Flickr.com)

- XML and DTD
- Unified Modeling Languages



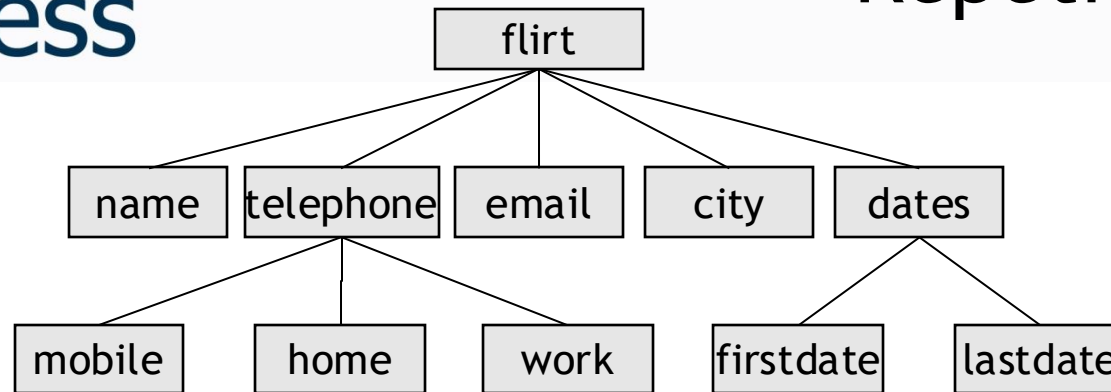
```
<?xml version=„1.0“ encoding=„ISO-8859-1“ ?>
```

Prologue

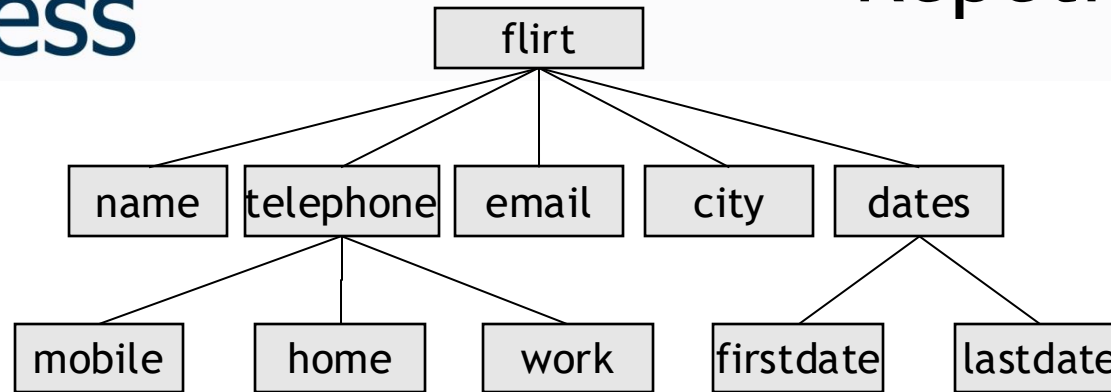
```
<flirt>  
  <name>Daisy</name>  
  <mobile>+436508469249</mobile>  
  <email>daisy@m-chair.de</email>  
  <city>Innsbruck</city>  
  <first date>2021-01-23</first date>  
  <last date>2021-05-01</last date>  
  <birthday>1997-11-13</birthday>  
  <vegetarian>no</vegetarian>  
  <status>single</status>  
</flirt>
```

Body

- The Document Type Definition (DTD) describes the structure of a document and defines a *grammar* for the XML document.
- Comparable to a type or variable declaration in a programming language.
- The DTD defines which elements and references may appear in the document based on it.
- The DTD also declares entities that are allowed to be used in the XML document.

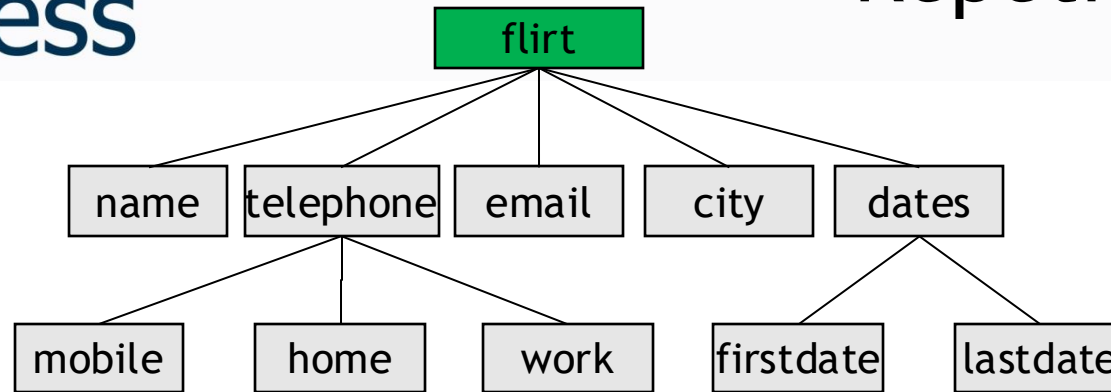


```
<flirt>
  <name>Daisy</name>
  <telephone>
    <mobile> 0177 / 1234567 </mobile>
  </telephone>
  <email> daisy@m-chair.de </email>
  <city> Innsbruck </city>
  <dates>
    <firstdate>2022-01-01 </firstdate>
    <lastdate> 2022-01-10 </lastdate>
  </dates>
</flirt>
```



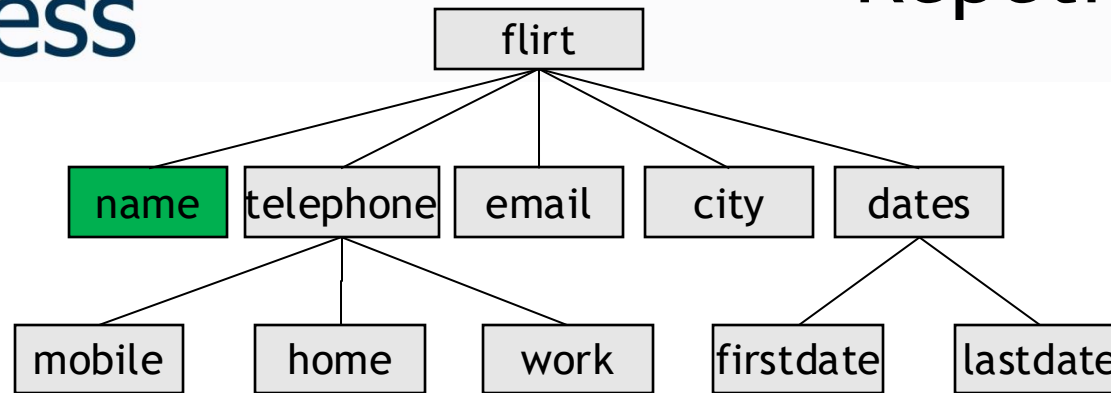
**Rule declaration for the elements in a DTD:**

```
<!DOCTYPE flirt [  
  ]>
```



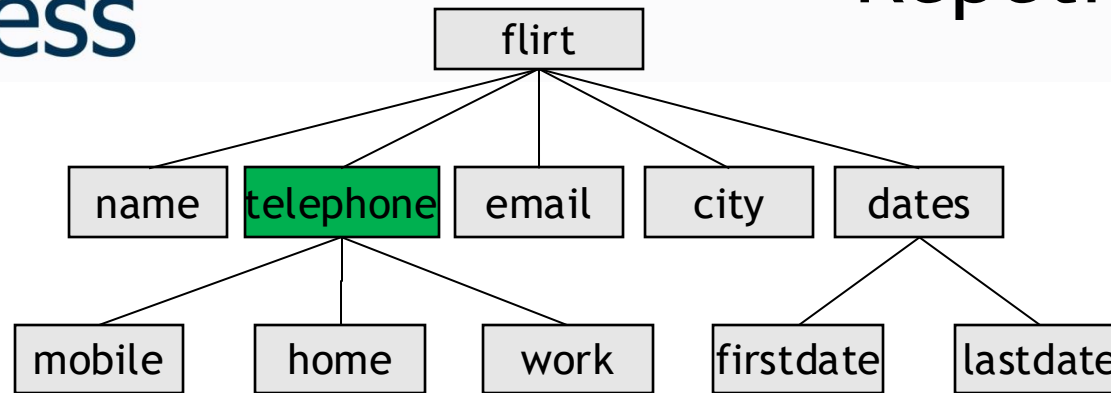
Rule declaration for the elements in a DTD:

```
<!DOCTYPE flirt [  
<!ELEMENT flirt (name, telephone, email, city, dates)>  
>
```



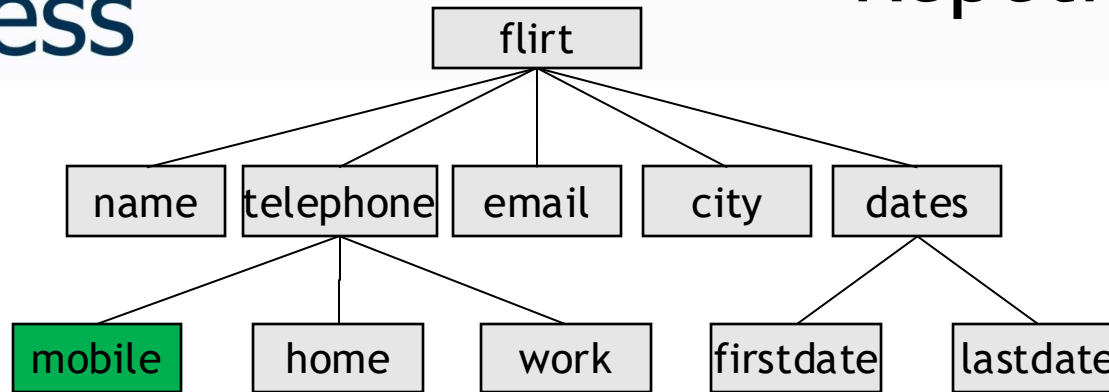
Rule declaration for the elements in a DTD:

```
<!DOCTYPE flirt [  
<!ELEMENT flirt (name, telephone, email, city, dates)>  
<!ELEMENT name (#PCDATA)>  
>
```



## Rule declaration for the elements in a DTD:

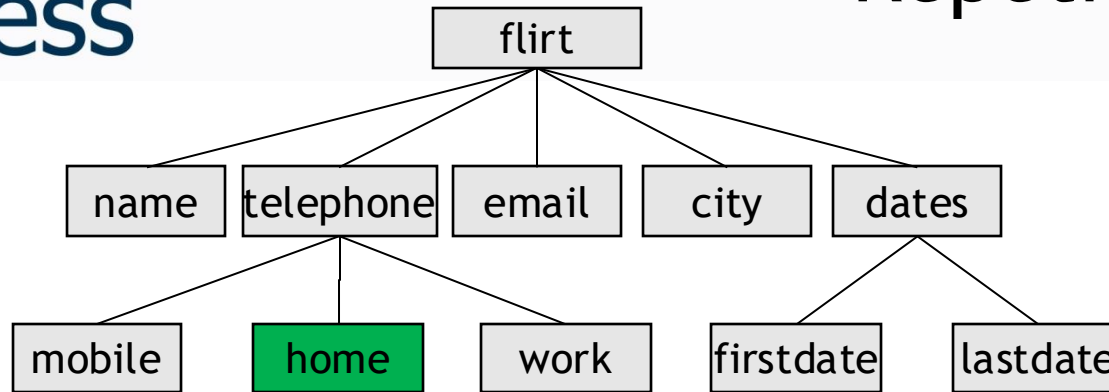
```
<!DOCTYPE flirt [  
<!ELEMENT flirt (name, telephone, email, city, dates)>  
<!ELEMENT name (#PCDATA)>  
<!ELEMENT telephone (mobile | home| work)>  
>
```



Rule declaration for the elements in a DTD:

```

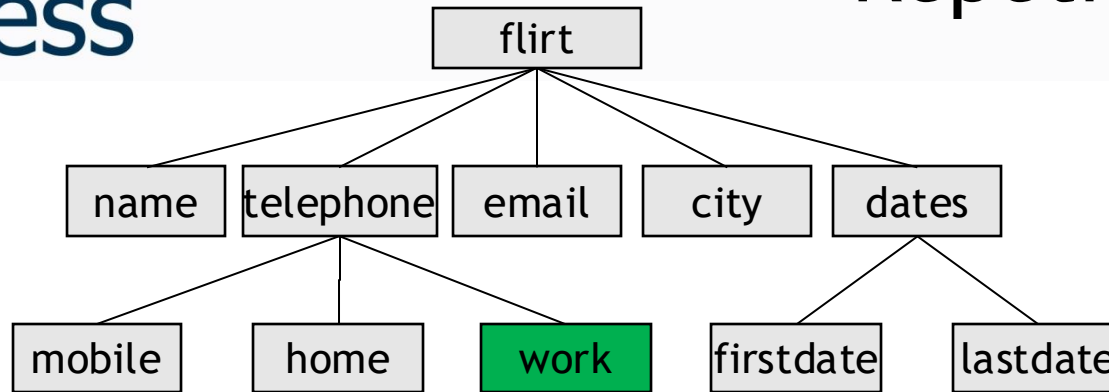
<!DOCTYPE flirt [
<!ELEMENT flirt (name, telephone, email, city, dates)>
<!ELEMENT name      (#PCDATA)>
<!ELEMENT telephone (mobile | home| work)>
<!ELEMENT mobile    (#PCDATA)>
]>
  
```



## Rule declaration for the elements in a DTD:

```

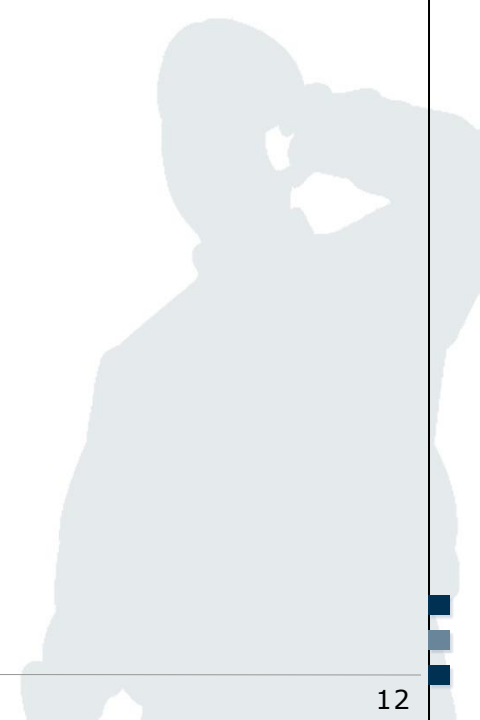
<!DOCTYPE flirt [
<!ELEMENT flirt (name, telephone, email, city, dates)>
<!ELEMENT name      (#PCDATA)>
<!ELEMENT telephone (mobile | home| work)>
<!ELEMENT mobile    (#PCDATA)>
<!ELEMENT home      (#PCDATA)>
]>
  
```

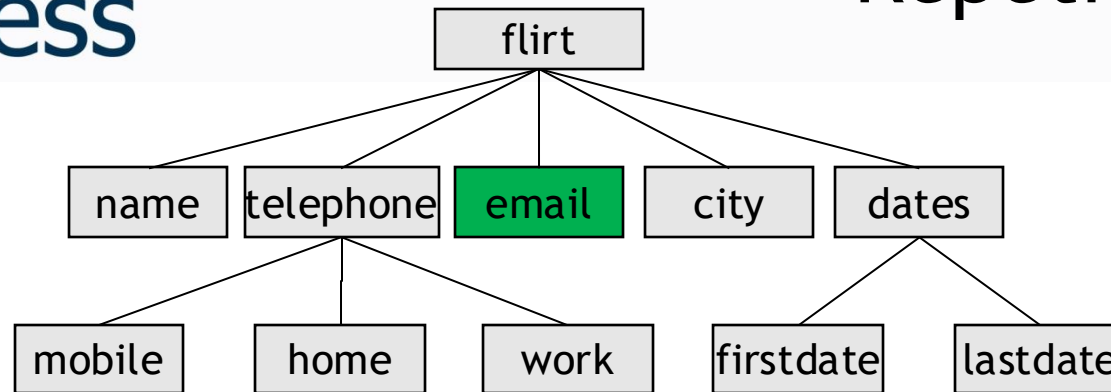


## Rule declaration for the elements in a DTD:

```

<!DOCTYPE flirt [
<!ELEMENT flirt (name, telephone, email, city, dates)>
<!ELEMENT name      (#PCDATA)>
<!ELEMENT telephone (mobile | home| work)>
<!ELEMENT mobile    (#PCDATA)>
<!ELEMENT home      (#PCDATA)>
<!ELEMENT work      (#PCDATA)>
]>
  
```

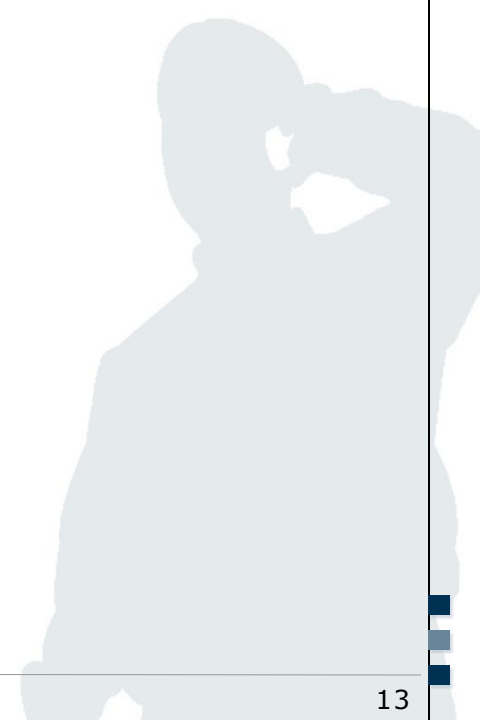


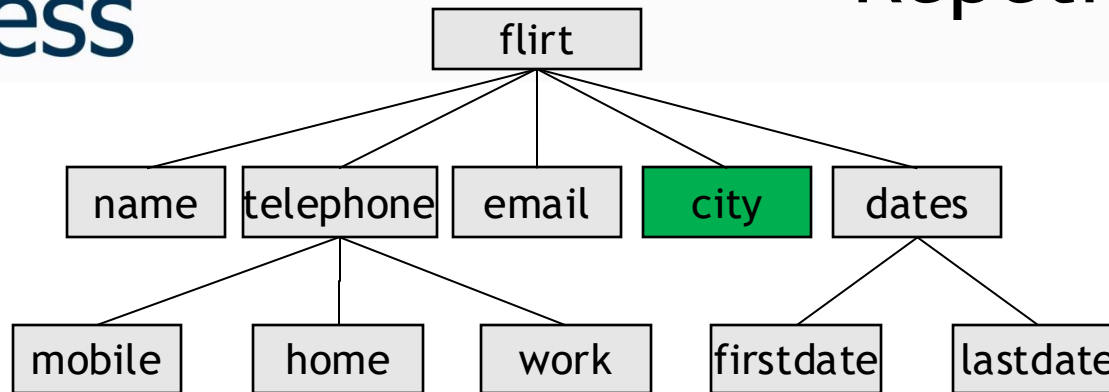


## Rule declaration for the elements in a DTD:

```

<!DOCTYPE flirt [
<!ELEMENT flirt (name, telephone, email, city, dates)>
<!ELEMENT name      (#PCDATA)>
<!ELEMENT telephone (mobile | home| work)>
<!ELEMENT mobile    (#PCDATA)>
<!ELEMENT home      (#PCDATA)>
<!ELEMENT work      (#PCDATA)>
<!ELEMENT email     (#PCDATA)>
]>
  
```

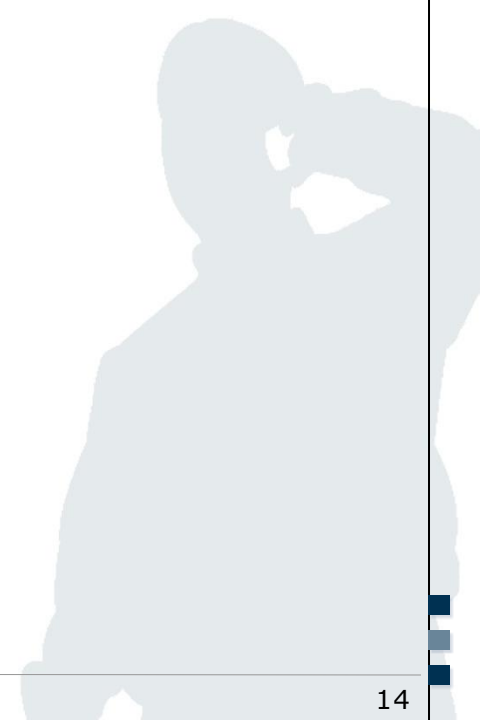


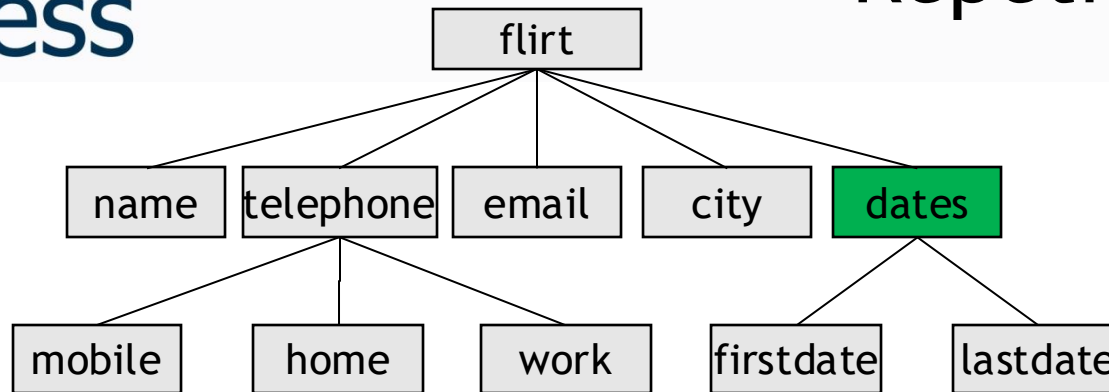


## Rule declaration for the elements in a DTD:

```

<!DOCTYPE flirt [
<!ELEMENT flirt (name, telephone, email, city, dates)>
<!ELEMENT name      (#PCDATA)>
<!ELEMENT telephone (mobile | home| work)>
<!ELEMENT mobile    (#PCDATA)>
<!ELEMENT home      (#PCDATA)>
<!ELEMENT work      (#PCDATA)>
<!ELEMENT email     (#PCDATA)>
<!ELEMENT city      (#PCDATA)>
]>
  
```

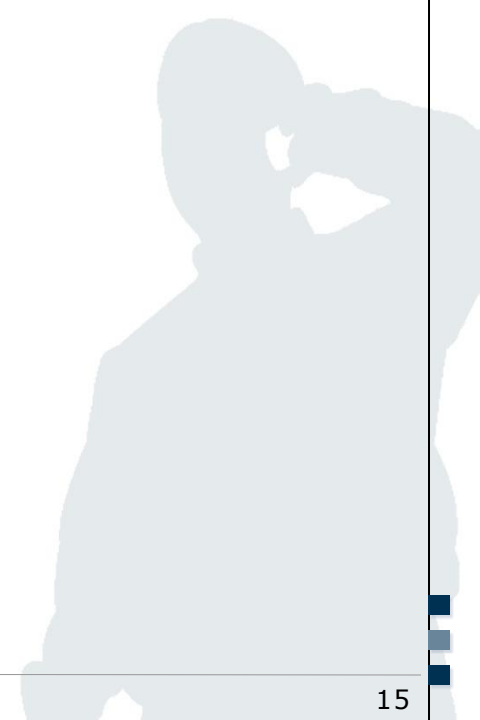


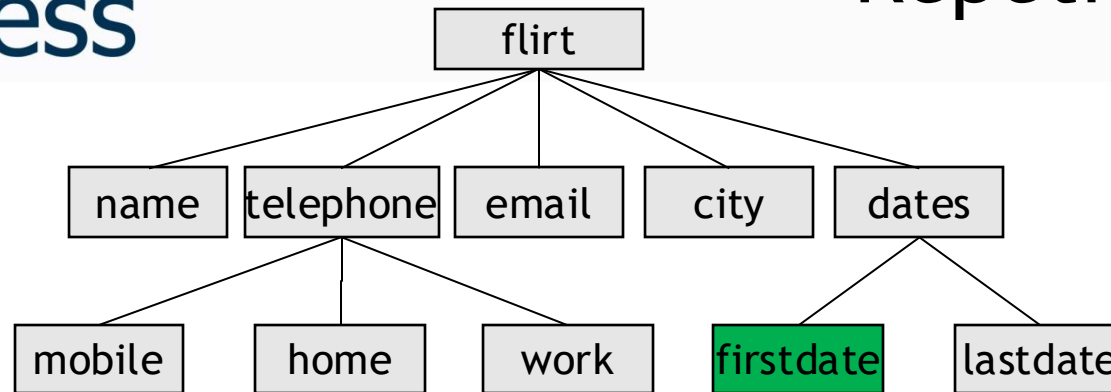


## Rule declaration for the elements in a DTD:

```

<!DOCTYPE flirt [
<!ELEMENT flirt (name, telephone, email, city, dates)>
<!ELEMENT name      (#PCDATA)>
<!ELEMENT telephone (mobile | home| work)>
<!ELEMENT mobile    (#PCDATA)>
<!ELEMENT home      (#PCDATA)>
<!ELEMENT work      (#PCDATA)>
<!ELEMENT email     (#PCDATA)>
<!ELEMENT city      (#PCDATA)>
<!ELEMENT dates     (firstdate, lastdate)>
]>
  
```

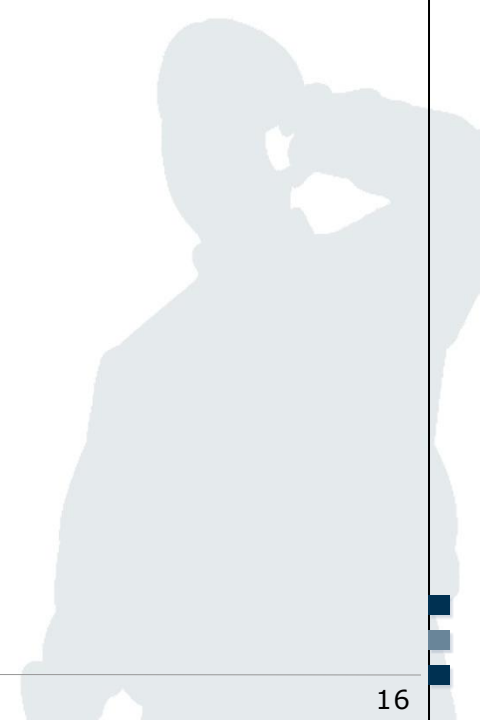


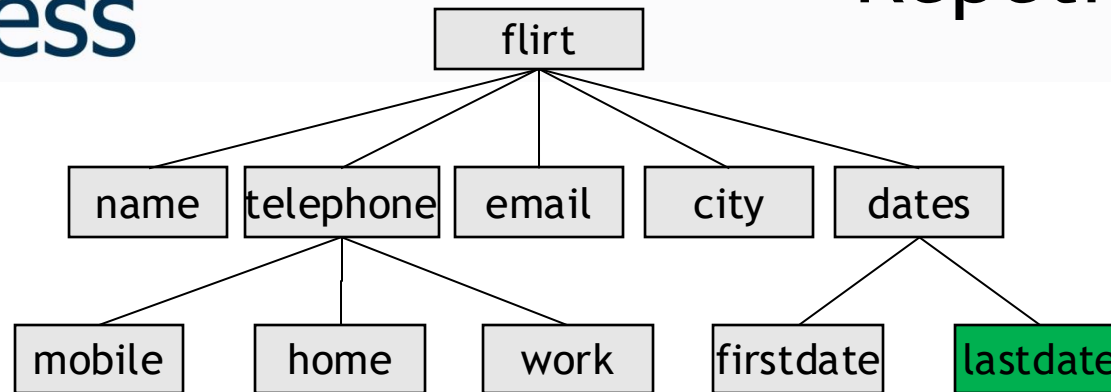


## Rule declaration for the elements in a DTD:

```

<!DOCTYPE flirt [
<!ELEMENT flirt (name, telephone, email, city, dates)>
<!ELEMENT name (#PCDATA)>
<!ELEMENT telephone (mobile | home| work)>
<!ELEMENT mobile (#PCDATA)>
<!ELEMENT home (#PCDATA)>
<!ELEMENT work (#PCDATA)>
<!ELEMENT email (#PCDATA)>
<!ELEMENT city (#PCDATA)>
<!ELEMENT dates (firstdate, lastdate)>
<!ELEMENT firstdate(#PCDATA)>
]>
  
```



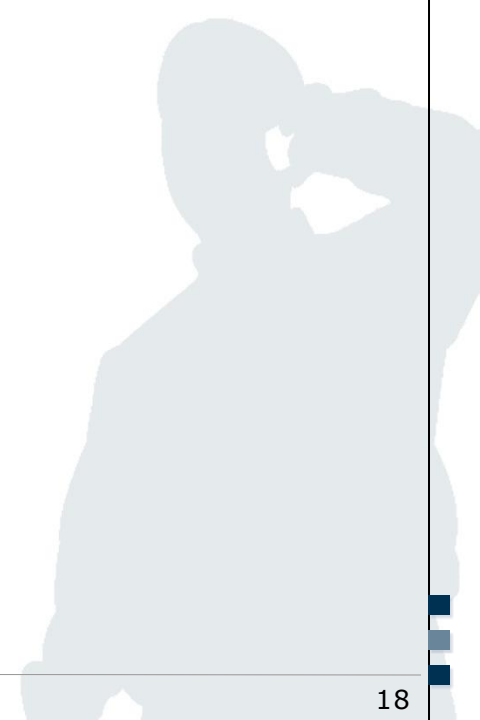


## Rule declaration for the elements in a DTD:

```

<!DOCTYPE flirt [
<!ELEMENT flirt (name, telephone, email, city, dates)>
<!ELEMENT name      (#PCDATA)>
<!ELEMENT telephone (mobile | home| work)>
<!ELEMENT mobile    (#PCDATA)>
<!ELEMENT home      (#PCDATA)>
<!ELEMENT work      (#PCDATA)>
<!ELEMENT email     (#PCDATA)>
<!ELEMENT city      (#PCDATA)>
<!ELEMENT dates     (firstdate, lastdate)>
<!ELEMENT firstdate (#PCDATA)>
<!ELEMENT lastdate  (#PCDATA)>
]
  
```

# Repetition: DTD - Grouping and Cardinality



- Cardinalities (for elements):

	empty: exactly one value is necessary
+	At least one value
?	None or one value
*	None or any number of values

- Content (in elements):

EMPTY	Empty element
ANY	Any content
	Selection list
,	Sequence
()	Grouping
(#PCDATA)	<i>Parsed Character Data</i> (mixed data)

```
<!DOCTYPE flirt [  
<!ELEMENT flirt (name, telephone,  
    email, city, dates)>  
<!ELEMENT name      (#PCDATA)>  
<!ELEMENT telephone (mobile | home |  
    work)>  
<!ELEMENT mobile    (#PCDATA)>  
<!ELEMENT home      (#PCDATA)>  
<!ELEMENT work      (#PCDATA)>  
<!ELEMENT email     (#PCDATA)>  
<!ELEMENT city      (#PCDATA)>  
<!ELEMENT dates     (firstdate,  
    lastdate)>  
<!ELEMENT firstdate (#PCDATA)>  
<!ELEMENT lastdate  (#PCDATA)>  
>
```

## Exemplary XML document

Select one element

→ Exactly three solutions:

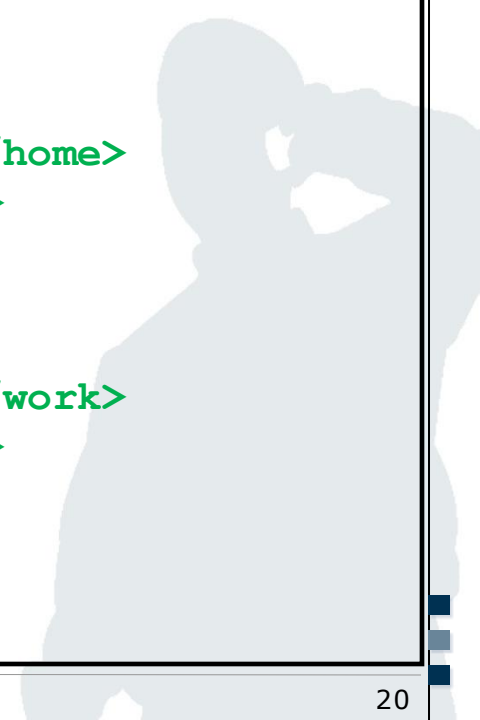
```
<telephone>  
  <mobile>...</mobile>  
</telephone>
```

OR

```
<telephone>  
  <home>...</home>  
</telephone>
```

OR

```
<telephone>  
  <work>...</work>  
</telephone>
```



```
<!DOCTYPE flirt [  
<!ELEMENT flirt (name, telephone,  
    email, city, dates)>  
<!ELEMENT name      (#PCDATA)>  
<!ELEMENT telephone (mobile | home |  
    work) +>  
<!ELEMENT mobile    (#PCDATA)>  
<!ELEMENT home      (#PCDATA)>  
<!ELEMENT work      (#PCDATA)>  
<!ELEMENT email     (#PCDATA)>  
<!ELEMENT city      (#PCDATA)>  
<!ELEMENT dates     (firstdate,  
    lastdate)>  
<!ELEMENT firstdate (#PCDATA)>  
<!ELEMENT lastdate  (#PCDATA)>  
>
```

## Exemplary XML document

At least one (+) repetition of the selection rule:

```
<telephone>  
  <mobile>...</mobile>  
  <mobile>...</mobile>  
  <home>...</home>  
</telephone>
```

or

```
<telephone>  
  <work>...</work>  
</telephone>
```

or

...

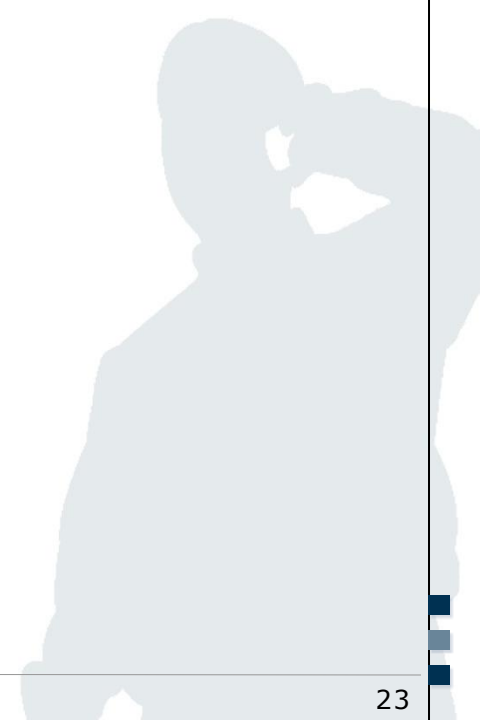
```
<!DOCTYPE flirt [  
<!ELEMENT flirt (name, telephone*,  
    email, city, dates)>  
<!ELEMENT name      (#PCDATA)>  
<!ELEMENT telephone (mobile | home |  
    work)>  
<!ELEMENT mobile    (#PCDATA)>  
<!ELEMENT home      (#PCDATA)>  
<!ELEMENT work      (#PCDATA)>  
<!ELEMENT email     (#PCDATA)>  
<!ELEMENT city      (#PCDATA)>  
<!ELEMENT dates     (firstdate,  
    lastdate)>  
<!ELEMENT firstdate (#PCDATA)>  
<!ELEMENT lastdate  (#PCDATA)>  
>
```

## Exemplary XML document

```
<telephone>  
    <mobile>...</mobile>  
</telephone>  
<telephone>  
    <home>...</home>  
</telephone>  
<telephone>  
    <work>...</work>  
</telephone>  
...
```



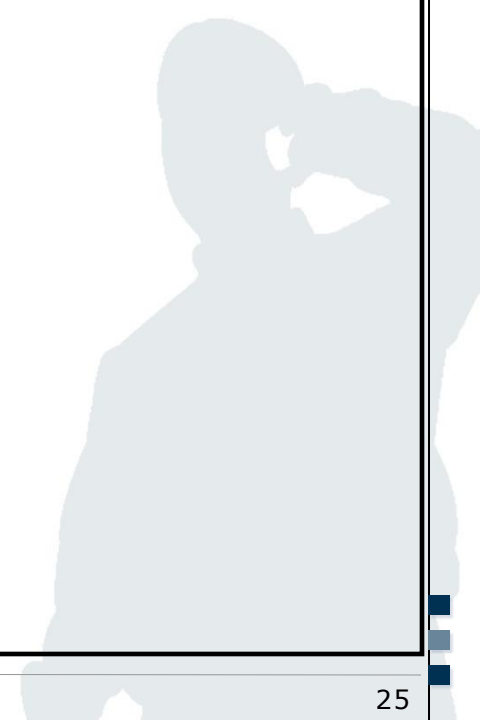
1.1 Create a DTD based on the following XML document. Note that the **<Location> element** can appear **1 or more times**.



```
<?xml version="1.0"?>
<Locations>
  <Location>
    <Name>DASEIN</Name>
    <Rating>Good</Rating>
  </Location>
  <Location>
    <Name>Sturm und
      Drang</Name>
    <Rating>Good</Rating>
  </Location>
</Locations>
```

```
<?xml version="1.0"?>
<Locations>
  <Location>
    <Name>DASEIN</Name>
    <Rating>Good</Rating>
  </Location>
  <Location>
    <Name>Sturm und
      Drang</Name>
    <Rating>Good</Rating>
  </Location>
</Locations>
```

```
<!DOCTYPE Locations [
] >
```



```
<?xml version="1.0"?>
<Locations>
  <Location>
    <Name>DASEIN</Name>
    <Rating>Good</Rating>
  </Location>
  <Location>
    <Name>Sturm und
      Drang</Name>
    <Rating>Good</Rating>
  </Location>
</Locations>
```

```
<!DOCTYPE Locations [
  <!ELEMENT Locations (Location+)>
] >
```

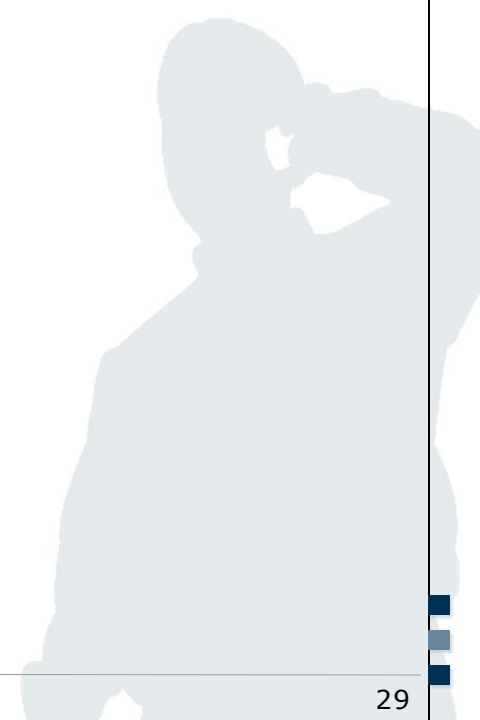
```
<?xml version="1.0"?>
<Locations>
  <Location>
    <Name>DASEIN</Name>
    <Rating>Good</Rating>
  </Location>
  <Location>
    <Name>Sturm und
      Drang</Name>
    <Rating>Good</Rating>
  </Location>
</Locations>
```

```
<!DOCTYPE Locations [
  <!ELEMENT Locations (Location+)>
  <!ELEMENT Location (Name,
    Rating)>
]>
```

```
<?xml version="1.0"?>
<Locations>
  <Location>
    <Name>DASEIN</Name>
    <Rating>Good</Rating>
  </Location>
  <Location>
    <Name>Sturm und
      Drang</Name>
    <Rating>Good</Rating>
  </Location>
</Locations>
```

```
<!DOCTYPE Locations [
  <!ELEMENT Locations (Location+)>
  <!ELEMENT Location (Name,
    Rating)>
  <!ELEMENT Name (#PCDATA)>
  <!ELEMENT Rating (#PCDATA)>
]>
```

1.2 Create an exemplary XML document based on the following DTD file. The **<records>** element **must not be empty**.



```
<!DOCTYPE records [  
<!ELEMENT records (record*)>  
<!ELEMENT record (title,  
artist, composer?, price)>  
<!ELEMENT title (#PCDATA)>  
<!ELEMENT artist (#PCDATA)>  
<!ELEMENT composer (#PCDATA)>  
<!ELEMENT price (#PCDATA)>  
>
```

```
<?xml version="1.0"?>
```

```
<!DOCTYPE records [  
<!ELEMENT records (record*)>  
<!ELEMENT record (title,  
artist, composer?, price)>  
<!ELEMENT title (#PCDATA)>  
<!ELEMENT artist (#PCDATA)>  
<!ELEMENT composer (#PCDATA)>  
<!ELEMENT price (#PCDATA)>  
>
```

```
<?xml version="1.0"?>
```

```
<records>
```

```
</records>
```

```
<!DOCTYPE records [  
<!ELEMENT records (record*)>  
<!ELEMENT record (title,  
artist, composer?, price)>  
<!ELEMENT title (#PCDATA)>  
<!ELEMENT artist (#PCDATA)>  
<!ELEMENT composer (#PCDATA)>  
<!ELEMENT price (#PCDATA)>  

```

```
<?xml version="1.0"?>
<records>
  <record>

  </record>
  <record>

  </record>
</records>
```

```
<!DOCTYPE records [
  <!ELEMENT records (record*)>
  <!ELEMENT record (title,
  artist, composer?, price)>
  <!ELEMENT title (#PCDATA)>
  <!ELEMENT artist (#PCDATA)>
  <!ELEMENT composer (#PCDATA)>
  <!ELEMENT price (#PCDATA)>
]>
```

```
<?xml version="1.0"?>
<records>
  <record>
    <title>Help!</title>

  </record>
  <record>
    <title>The very best
of</title>

  </record>
</records>
```

```
<!DOCTYPE records [
<!ELEMENT records (record*)>
<!ELEMENT record (title,
artist, composer?, price)>
<!ELEMENT title (#PCDATA)>
<!ELEMENT artist (#PCDATA)>
<!ELEMENT composer (#PCDATA)>
<!ELEMENT price (#PCDATA)>
]>
```

```
<?xml version="1.0"?>
<records>
  <record>
    <title>Help!</title>
    <artist>The Beatles</artist>

  </record>
  <record>
    <title>The very best
of</title>
    <artist>Lang Lang</artist>

  </record>
</records>
```

```
<!DOCTYPE records [
  <!ELEMENT records (record*)>
  <!ELEMENT record (title,
artist, composer?, price)>
  <!ELEMENT title (#PCDATA)>
  <!ELEMENT artist (#PCDATA)>
  <!ELEMENT composer (#PCDATA)>
  <!ELEMENT price (#PCDATA)>
]>
```

```
<?xml version="1.0"?>
<records>
  <record>
    <title>Help!</title>
    <artist>The Beatles</artist>

  </record>
  <record>
    <title>The very best
of</title>
    <artist>Lang Lang</artist>
    <composer>Bach</composer>

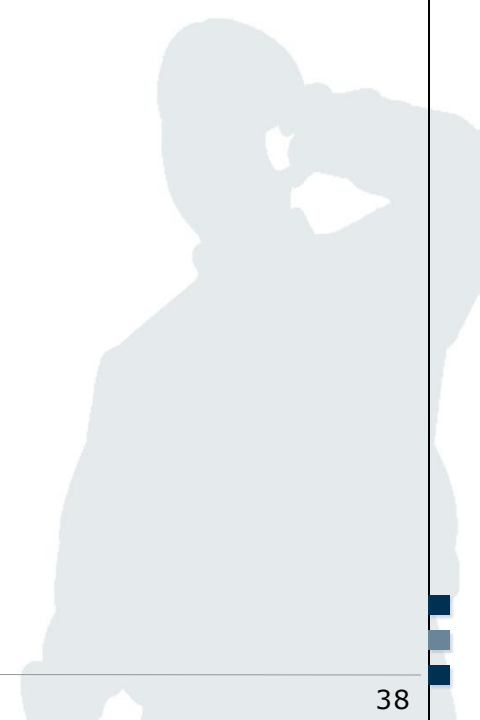
  </record>
</records>
```

```
<!DOCTYPE records [
  <!ELEMENT records (record*)>
  <!ELEMENT record (title,
artist, composer?, price)>
  <!ELEMENT title (#PCDATA)>
  <!ELEMENT artist (#PCDATA)>
  <!ELEMENT composer (#PCDATA)>
  <!ELEMENT price (#PCDATA)>
]>
```

```
<?xml version="1.0"?>
<records>
  <record>
    <title>Help!</title>
    <artist>The Beatles</artist>
    <price>9.95</price>
  </record>
  <record>
    <title>The very best
of</title>
    <artist>Lang Lang</artist>
    <composer>Bach</composer>
    <price>19.90</price>
  </record>
</records>
```

```
<!DOCTYPE records [
  <!ELEMENT records (record*)>
  <!ELEMENT record (title,
artist, composer?, price)>
  <!ELEMENT title (#PCDATA)>
  <!ELEMENT artist (#PCDATA)>
  <!ELEMENT composer (#PCDATA)>
  <!ELEMENT price (#PCDATA)>
]>
```

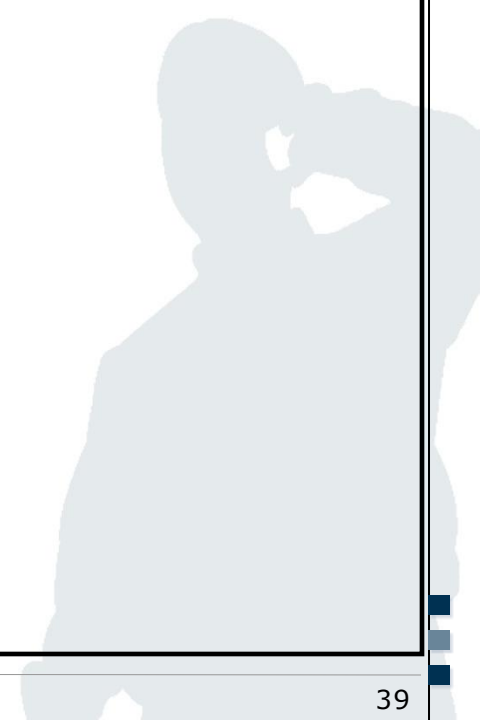
1.3 Create a DTD based on the following XML document.  
Note that the **<email>** element is mandatory and  
**<student>** should appear **at least 1 time**.



<email> element is mandatory and  
<student> should appear **at least 1 time**

## XML → DTD

```
<?xml version="1.0"?>
<lecture>
  <student>
    <name>Max Muster</name>
    <subject>WiWi</subject>
    <semester>4</semester>
    <email>max@abc.de</email>
    <email>max@xyz.de</email>
    <fax>123456789</fax>
  </student>
  <student>
    <name>Erika Muster</name>
    <subject>WiWI</subject>
    <semester>4</semester>
    <email>em@mail.de</email>
  </student>
</lecture>
```

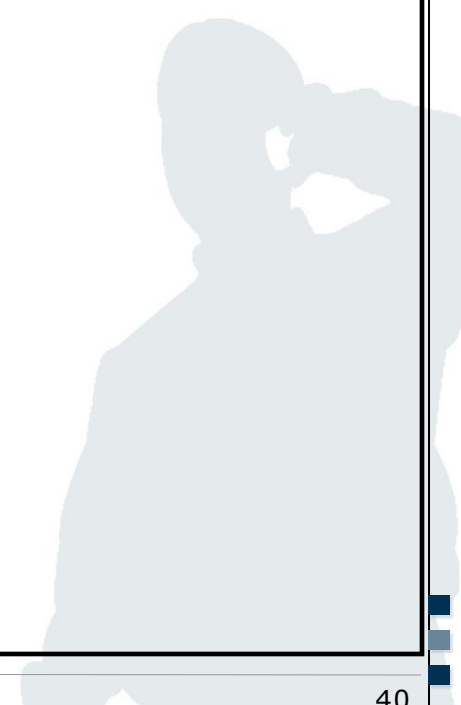


<email> element is mandatory and  
<student> should appear **at least 1 time**

## XML → DTD

```
<?xml version="1.0"?>
<lecture>
  <student>
    <name>Max Muster</name>
    <subject>WiWi</subject>
    <semester>4</semester>
    <email>max@abc.de</email>
    <email>max@xyz.de</email>
    <fax>123456789</fax>
  </student>
  <student>
    <name>Erika Muster</name>
    <subject>WiWI</subject>
    <semester>4</semester>
    <email>em@mail.de</email>
  </student>
</lecture>
```

```
<!DOCTYPE lecture [
] >
```

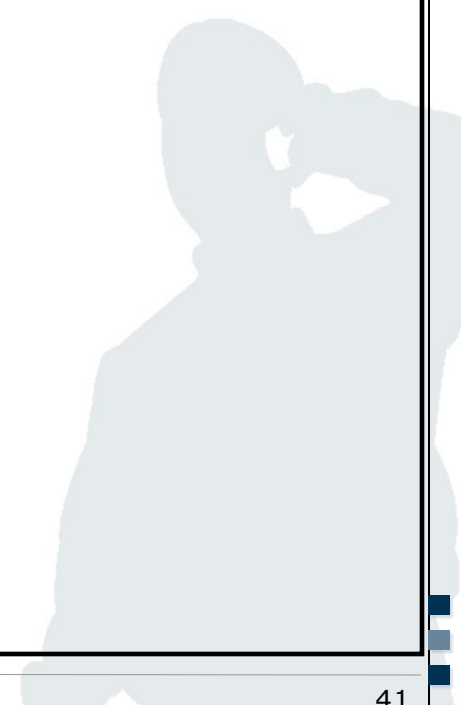


`<email>` element is mandatory and  
`<student>` should appear **at least 1 time**

## XML → DTD

```
<?xml version="1.0"?>
<lecture>
  <student>
    <name>Max Muster</name>
    <subject>WiWi</subject>
    <semester>4</semester>
    <email>max@abc.de</email>
    <email>max@xyz.de</email>
    <fax>123456789</fax>
  </student>
  <student>
    <name>Erika Muster</name>
    <subject>WiWI</subject>
    <semester>4</semester>
    <email>em@mail.de</email>
  </student>
</lecture>
```

```
<!DOCTYPE lecture [
  <!ELEMENT lecture (student+)>
] >
```

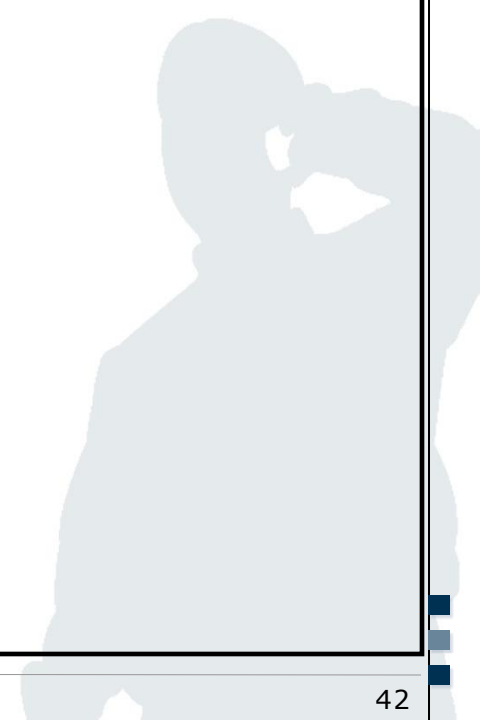


`<email>` element is mandatory and  
`<student>` should appear **at least 1 time**

## XML → DTD

```
<?xml version="1.0"?>
<lecture>
  <student>
    <name>Max Muster</name>
    <subject>WiWi</subject>
    <semester>4</semester>
    <email>max@abc.de</email>
    <email>max@xyz.de</email>
    <fax>123456789</fax>
  </student>
  <student>
    <name>Erika Muster</name>
    <subject>WiWI</subject>
    <semester>4</semester>
    <email>em@mail.de</email>
  </student>
</lecture>
```

```
<!DOCTYPE lecture [
  <!ELEMENT lecture (student+)>
  <!ELEMENT student (name,
  subject, semester, email+,
  fax?)>
]>
```

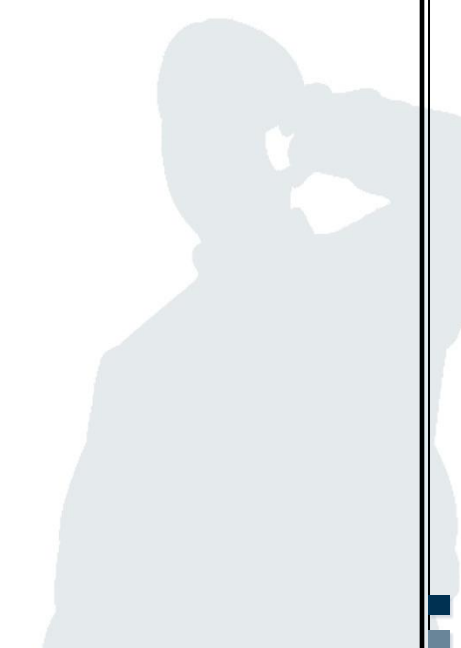


`<email>` element is mandatory and  
`<student>` should appear **at least 1 time**

## XML → DTD

```
<?xml version="1.0"?>
<lecture>
  <student>
    <name>Max Muster</name>
    <subject>WiWi</subject>
    <semester>4</semester>
    <email>max@abc.de</email>
    <email>max@xyz.de</email>
    <fax>123456789</fax>
  </student>
  <student>
    <name>Erika Muster</name>
    <subject>WiWI</subject>
    <semester>4</semester>
    <email>em@mail.de</email>
  </student>
</lecture>
```

```
<!DOCTYPE lecture [
  <!ELEMENT lecture (student+)>
  <!ELEMENT student (name,
subject, semester, email+,
fax?)>
  <!ELEMENT name (#PCDATA)>
]>
```

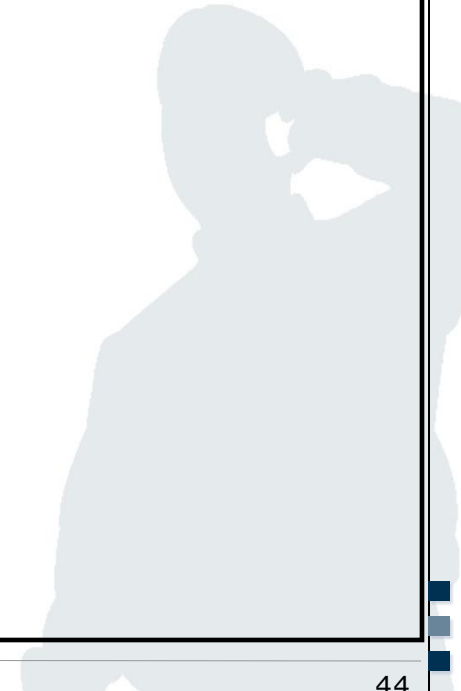


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<lecture>
  <student>
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    <email>max@abc.de</email>
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  </student>
  <student>
    <name>Erika Muster</name>
    <subject>WiWI</subject>
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    <email>em@mail.de</email>
  </student>
</lecture>
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<!DOCTYPE lecture [
  <!ELEMENT lecture (student+)>
  <!ELEMENT student (name,
subject, semester, email+,
fax?)>
  <!ELEMENT name (#PCDATA)>
  <!ELEMENT subject (#PCDATA)>
]>
```

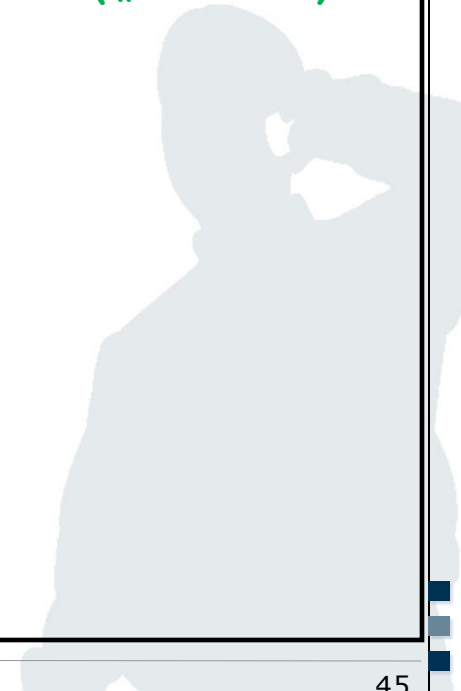


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## XML → DTD

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<?xml version="1.0"?>
<lecture>
  <student>
    <name>Max Muster</name>
    <subject>WiWi</subject>
    <semester>4</semester>
    <email>max@abc.de</email>
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    <fax>123456789</fax>
  </student>
  <student>
    <name>Erika Muster</name>
    <subject>WiWI</subject>
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    <email>em@mail.de</email>
  </student>
</lecture>
```

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<!DOCTYPE lecture [
  <!ELEMENT lecture (student+)>
  <!ELEMENT student (name,
subject, semester, email+,
fax?)>
  <!ELEMENT name (#PCDATA)>
  <!ELEMENT subject (#PCDATA)>
  <!ELEMENT semester (#PCDATA)>
]>
```

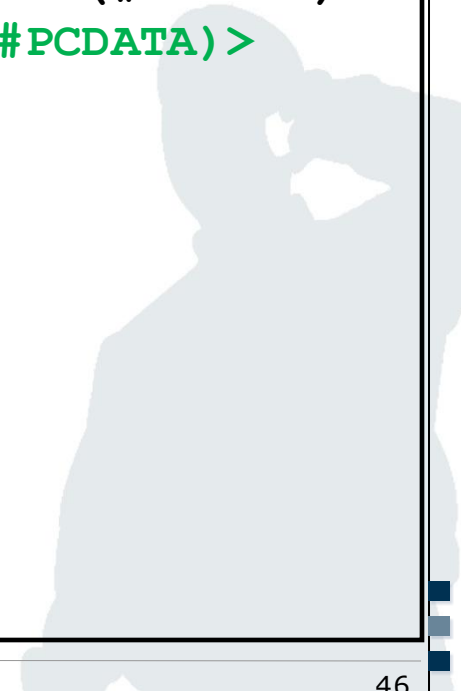


<email> element is mandatory and  
<student> should appear **at least 1 time**

## XML → DTD

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<?xml version="1.0"?>
<lecture>
  <student>
    <name>Max Muster</name>
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    <semester>4</semester>
    <email>max@abc.de</email>
    <email>max@xyz.de</email>
    <fax>123456789</fax>
  </student>
  <student>
    <name>Erika Muster</name>
    <subject>WiWI</subject>
    <semester>4</semester>
    <email>em@mail.de</email>
  </student>
</lecture>
```

```
<!DOCTYPE lecture [
  <!ELEMENT lecture (student+)>
  <!ELEMENT student (name,
subject, semester, email+,
fax?)>
  <!ELEMENT name (#PCDATA)>
  <!ELEMENT subject (#PCDATA)>
  <!ELEMENT semester (#PCDATA)>
  <!ELEMENT email (#PCDATA)>
]>
```



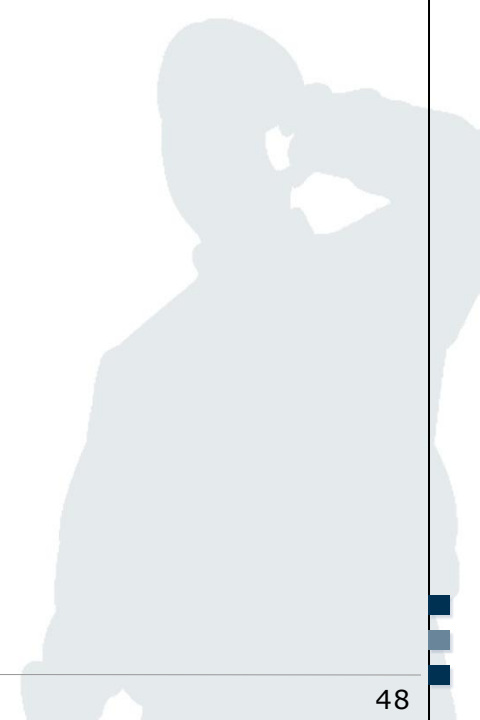
`<email>` element is mandatory and  
`<student>` should appear **at least 1 time**

## XML → DTD

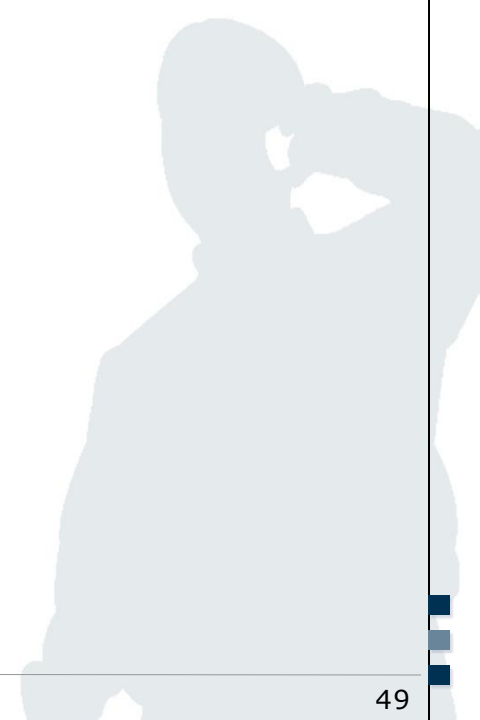
```
<?xml version="1.0"?>
<lecture>
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    <name>Max Muster</name>
    <subject>WiWi</subject>
    <semester>4</semester>
    <email>max@abc.de</email>
    <email>max@xyz.de</email>
    <fax>123456789</fax>
  </student>
  <student>
    <name>Erika Muster</name>
    <subject>WiWi</subject>
    <semester>4</semester>
    <email>em@mail.de</email>
  </student>
</lecture>
```

```
<!DOCTYPE lecture [
  <!ELEMENT lecture (student+)>
  <!ELEMENT student (name,
subject, semester, email+,
fax?)>
  <!ELEMENT name (#PCDATA)>
  <!ELEMENT subject (#PCDATA)>
  <!ELEMENT semester (#PCDATA)>
  <!ELEMENT email (#PCDATA)>
  <!ELEMENT fax (#PCDATA)>
]>
```

- XML and DTD
- Unified Modeling Languages



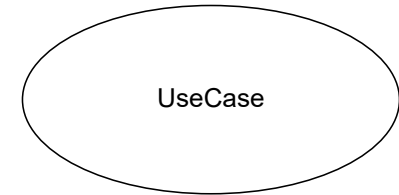
# UML - Use Case Diagram



# Repetition: Use Case Diagram Notation Elements (1/3)

- **Use Case**

- Representation of a sequence of actions that provides value to an actor.

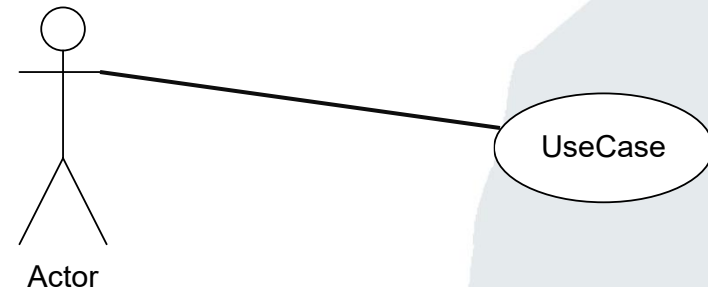


- **User of the system**



- **Association**

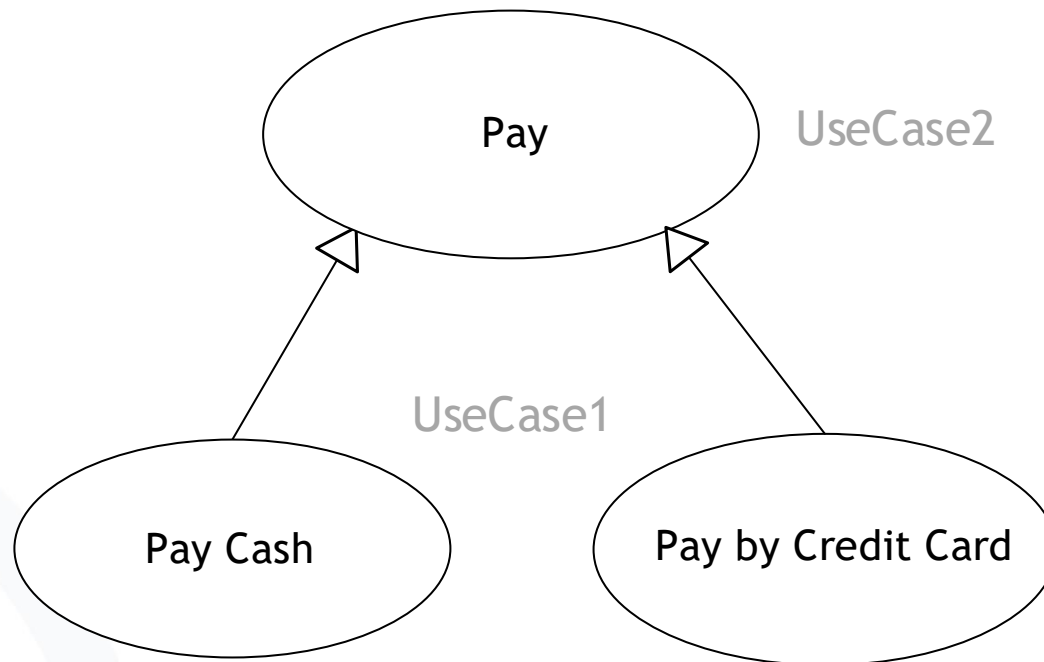
- Interaction of an actor with a use case



# Repetition: Use Case Diagram Notation Elements (2/3)

- **Generalisation**

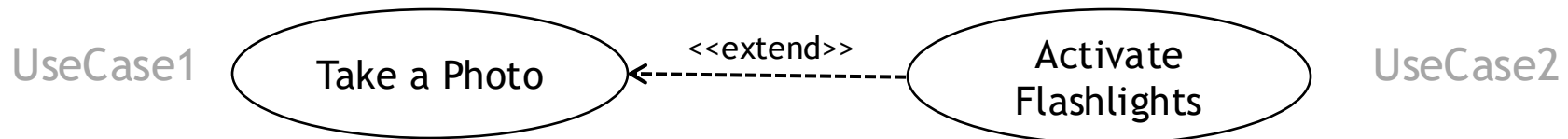
- Generalisation of use cases
- UseCase2 generalises the behaviour of UseCase1



# Repetition: Use Case Diagram Notation Elements (3/3)

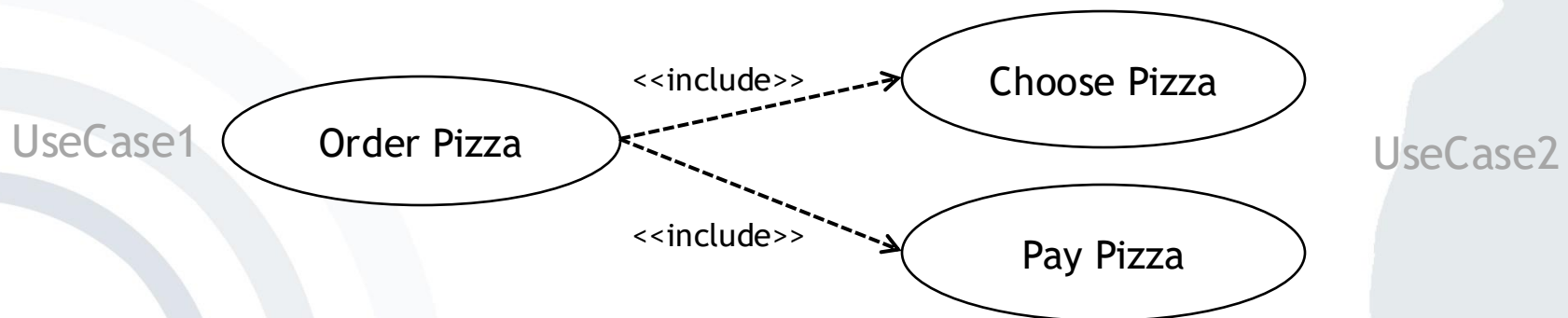
- **<<Extend>>**

- Extends a use case
- UseCase2 extends UseCase1



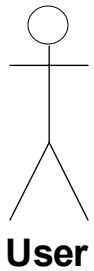
- **<<Include>>**

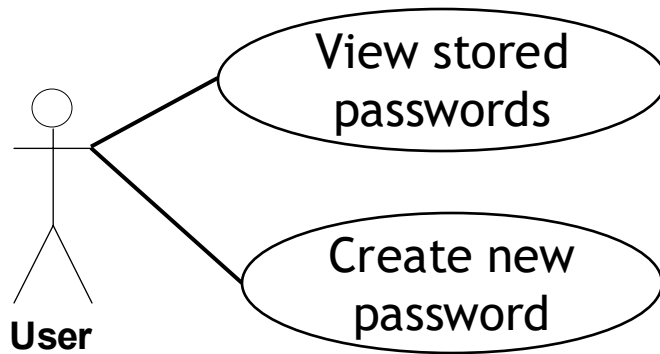
- Inclusion of a use case
- UseCase1 includes the behaviour of UseCase2

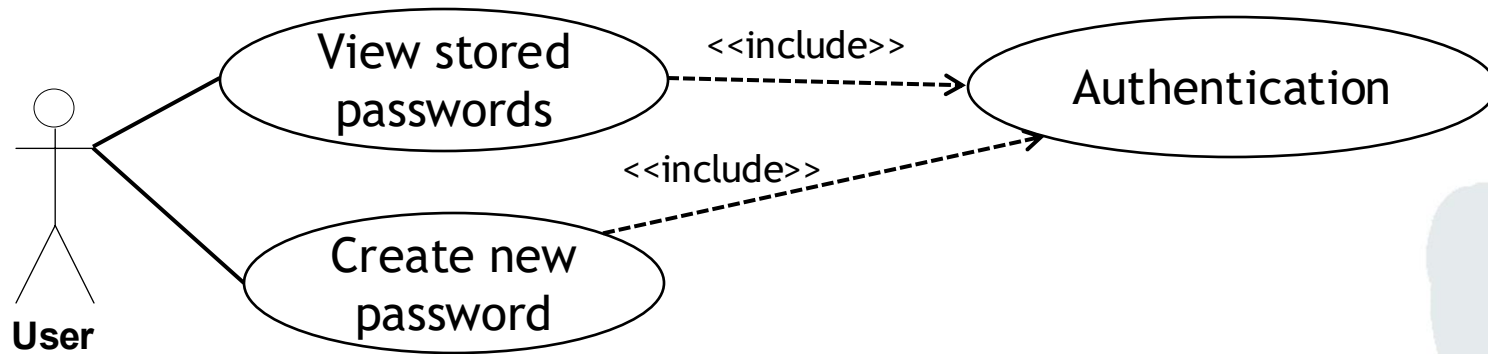


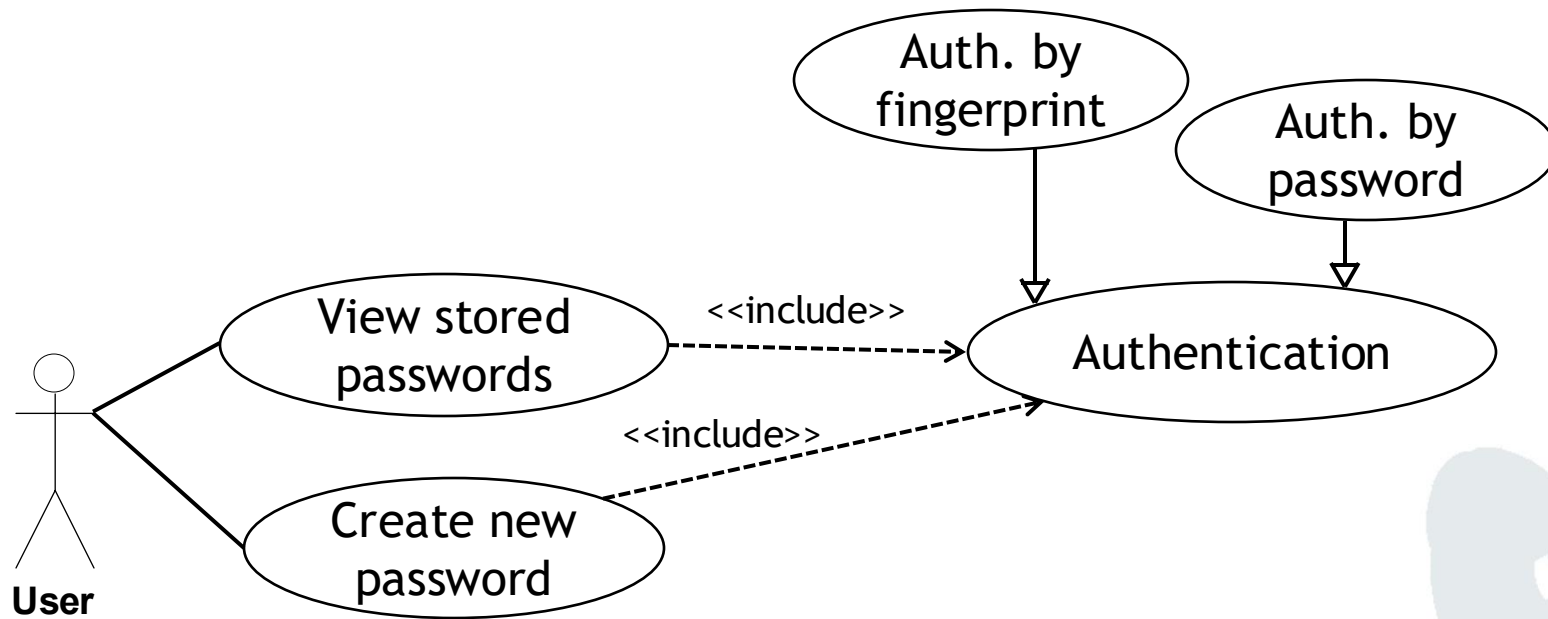
2.1 Create a use case diagram for a password manager app:

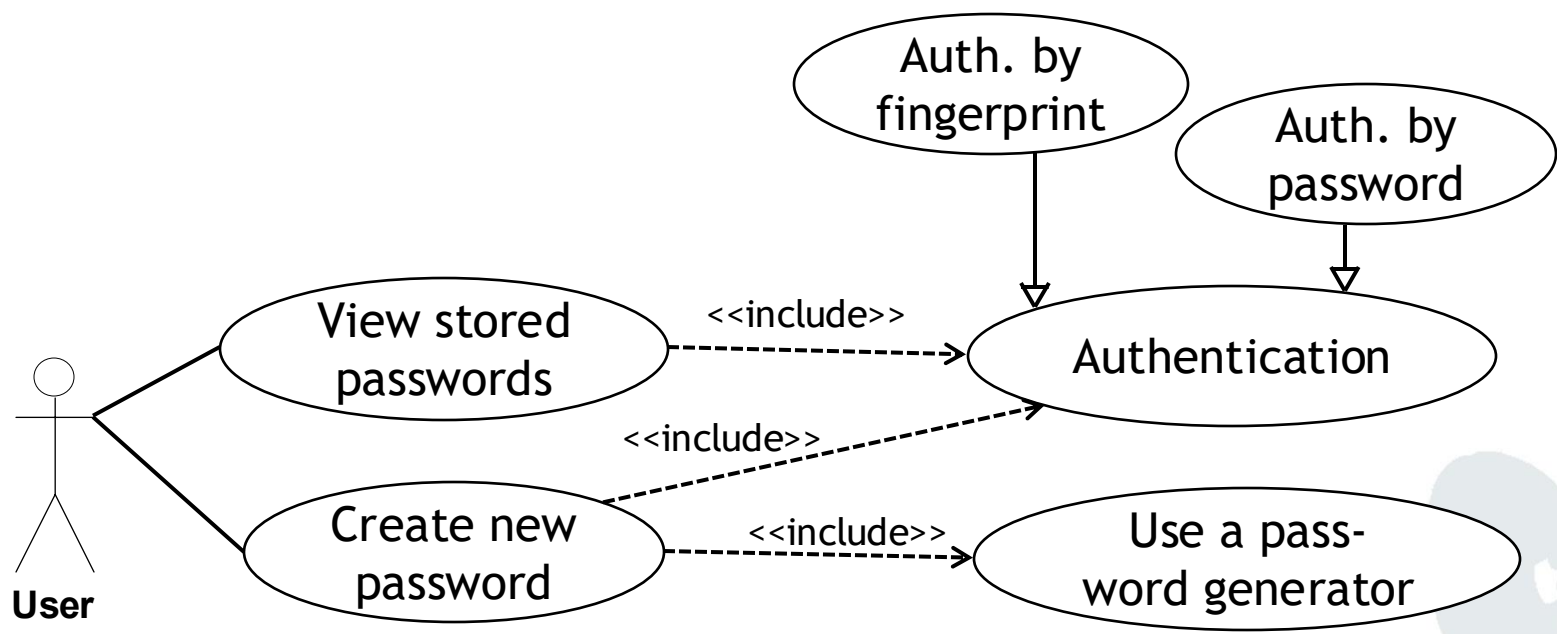
A user can either **view stored passwords** or **create a new password**. Both use cases require an **authentication**. The app supports both user **authentication by password** and **authentication by fingerprint**. To **create a new password**, the user has to **use** an integrated **password generator**. Furthermore, he has to **enter a description** for his new password.



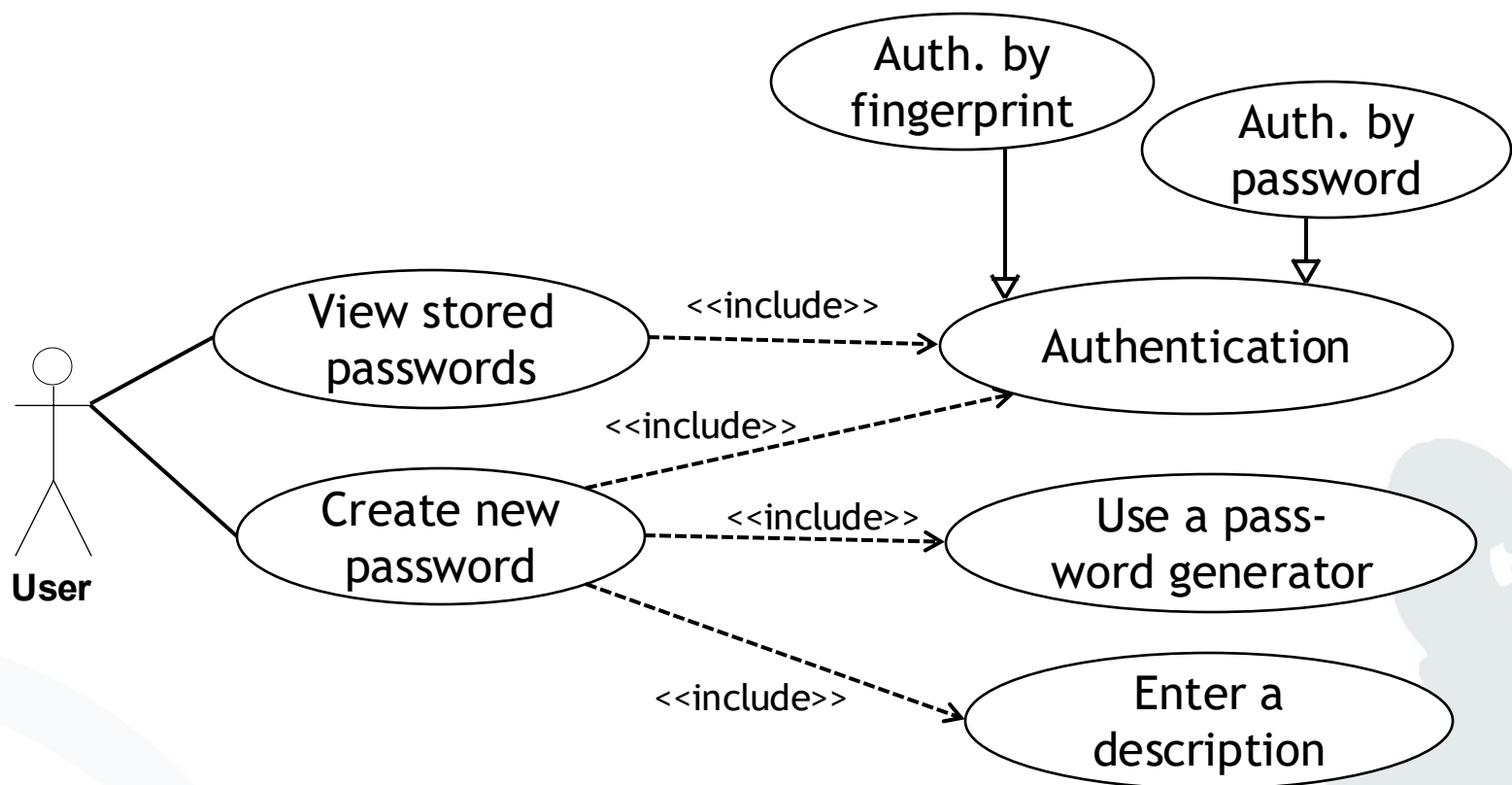




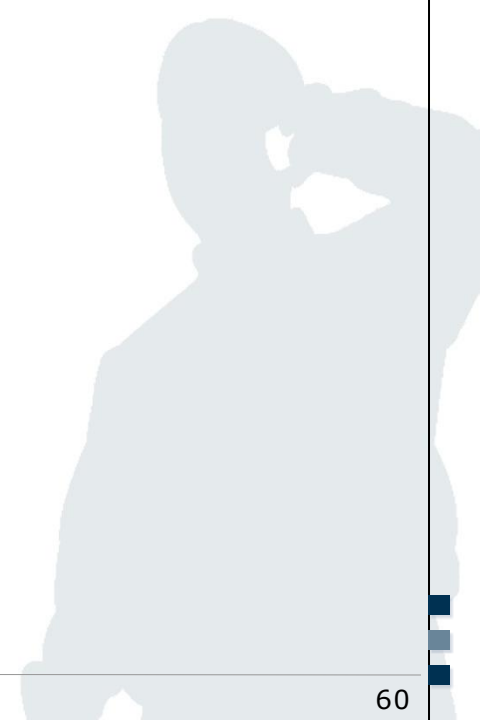




# Use Case Diagram



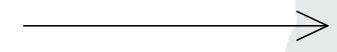
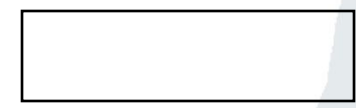
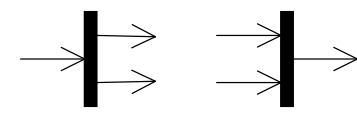
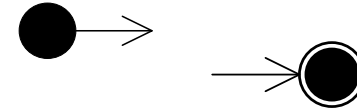
# UML - Activity Diagram



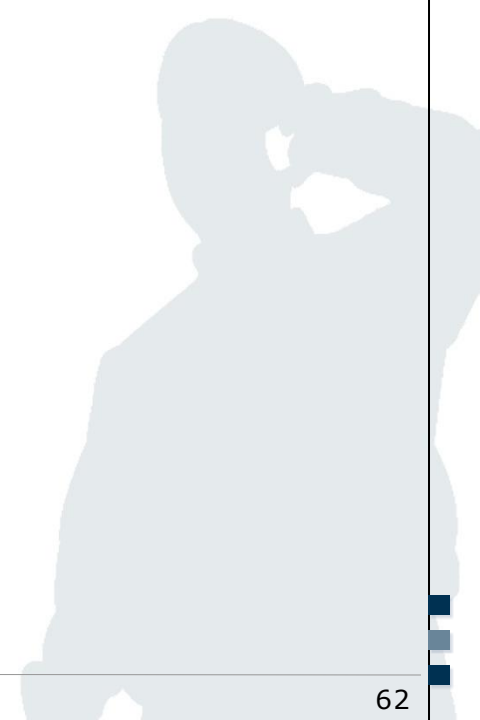
# Repetition: Activity Diagram Notation Elements

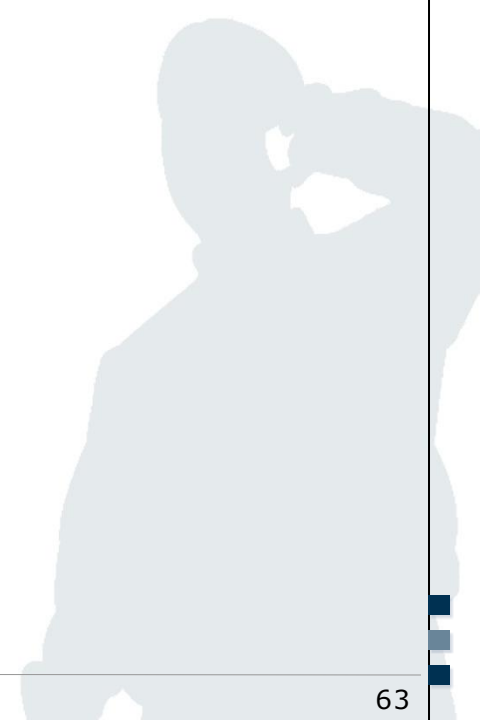
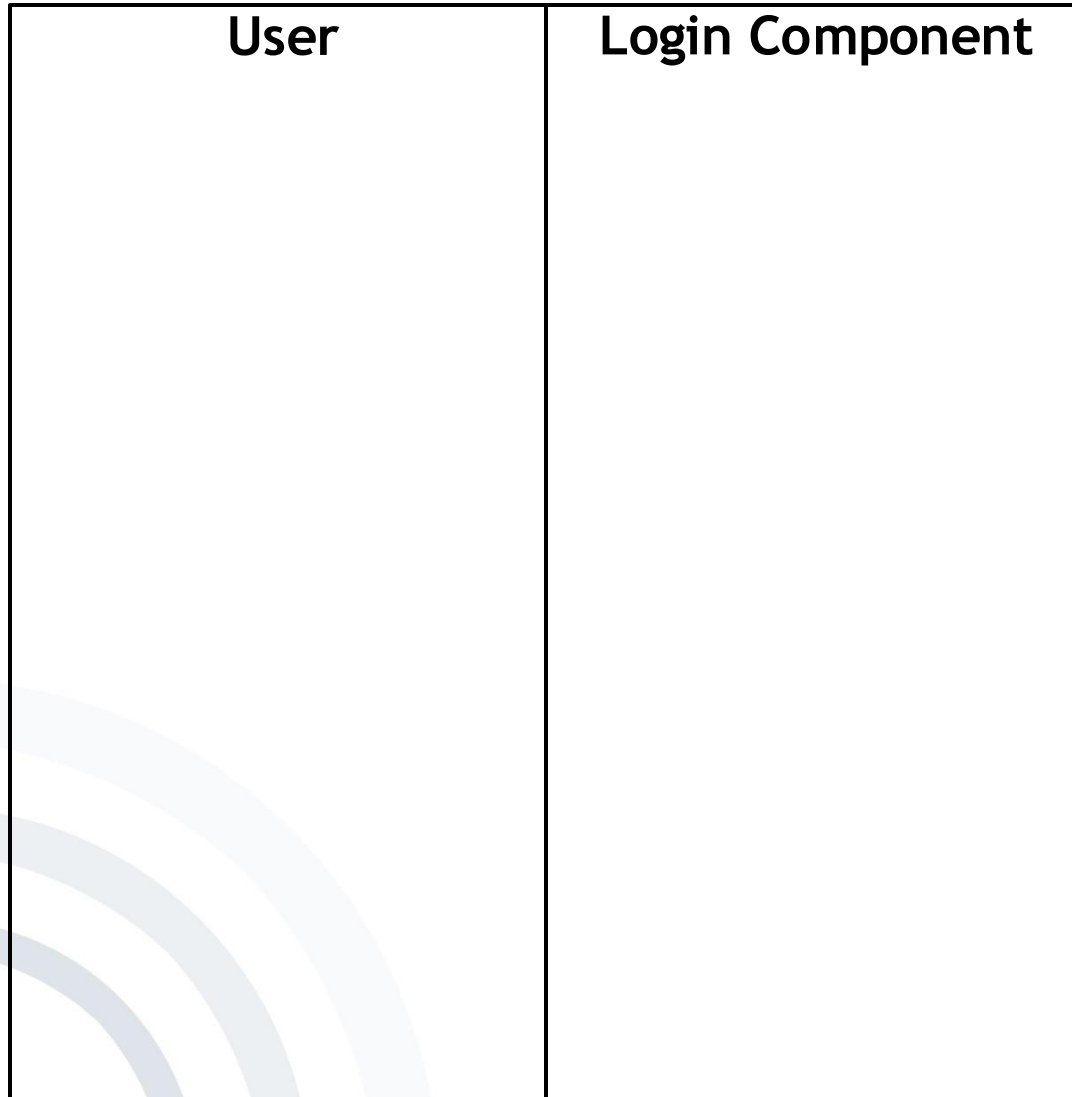
## Notation elements

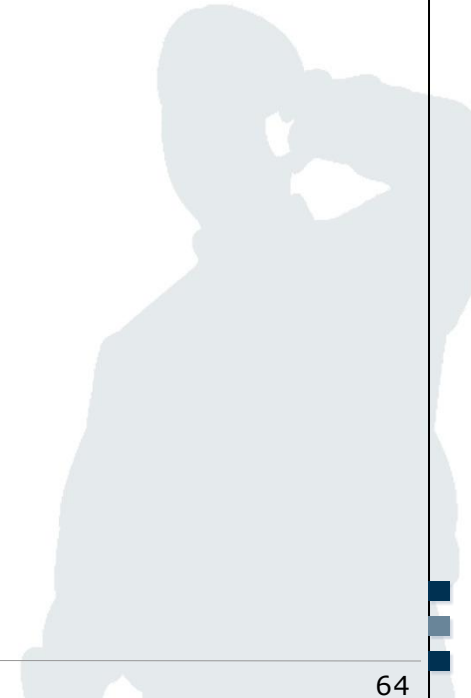
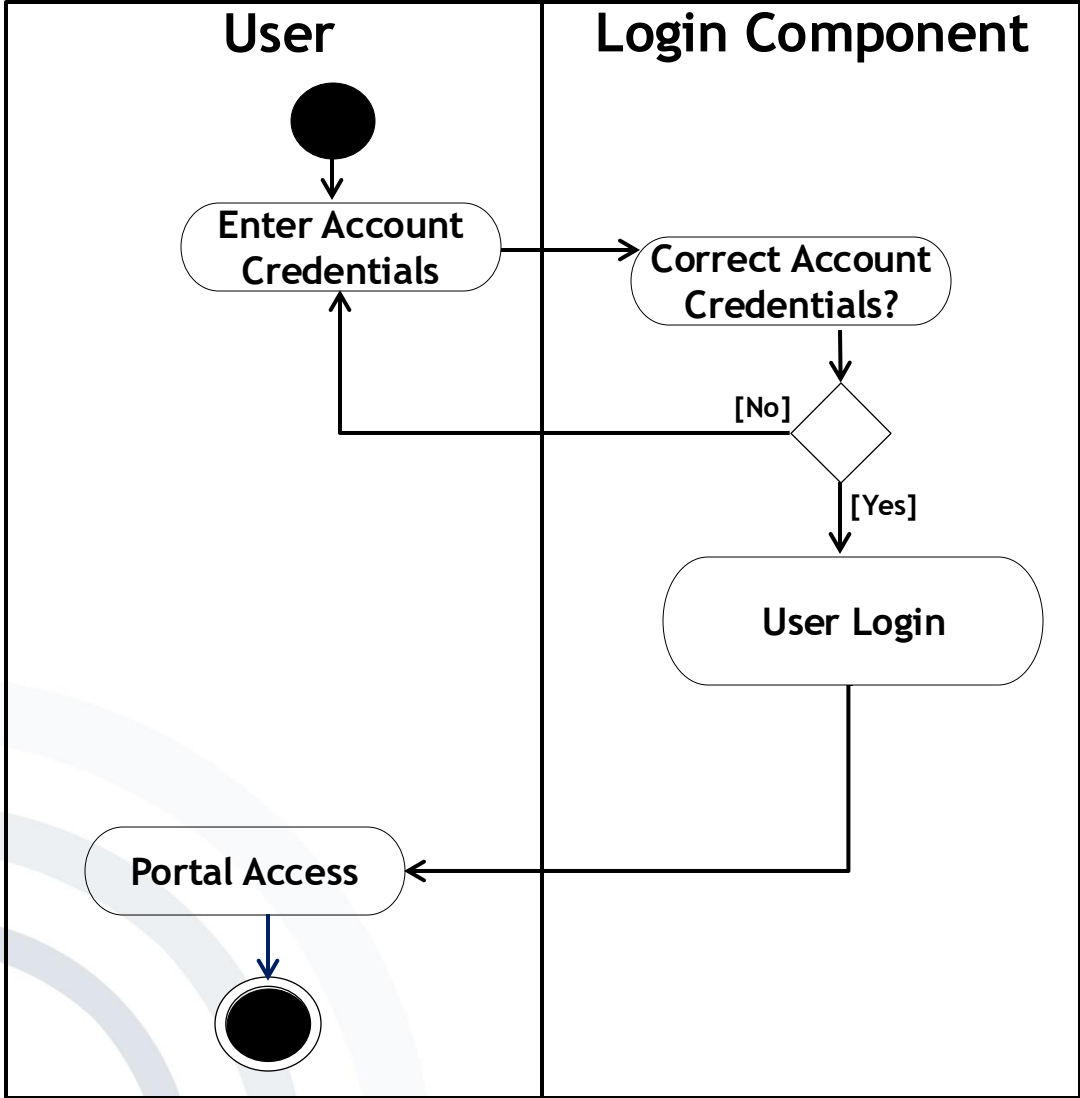
- Initial state/final state
- Activity
- Decision
- Split/join
- Responsibility
- Activity flow



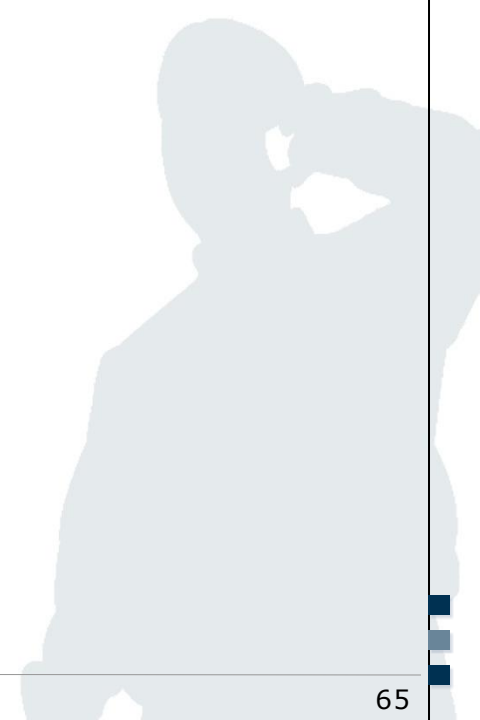
2.2 a) You are one of the programmers of the MyPlace Service. Assume your manager wants you to model the login process by using the appropriate UML diagram.

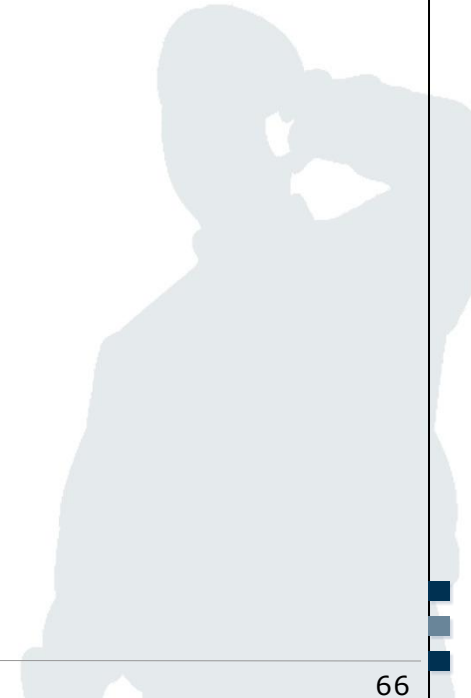
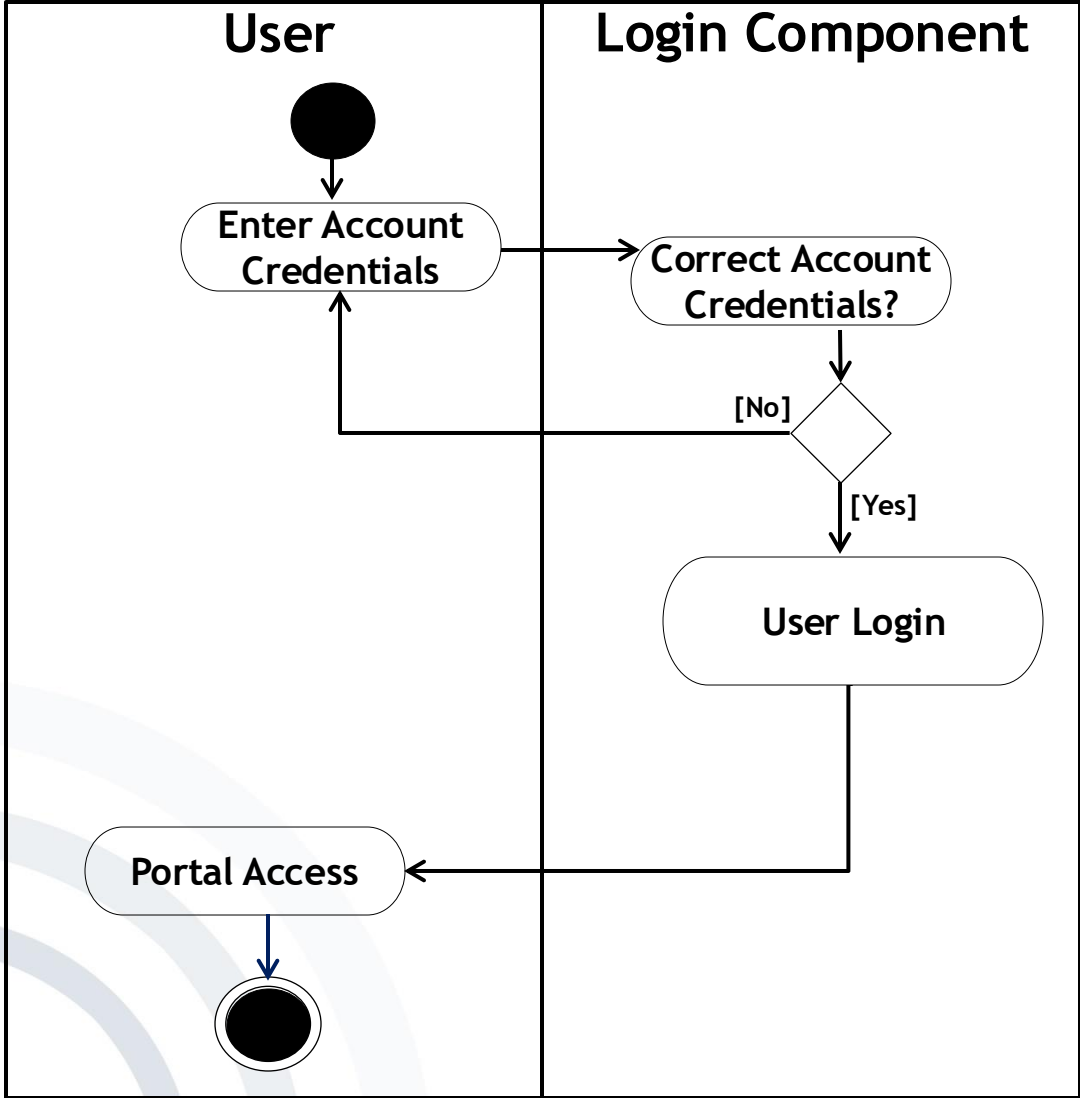


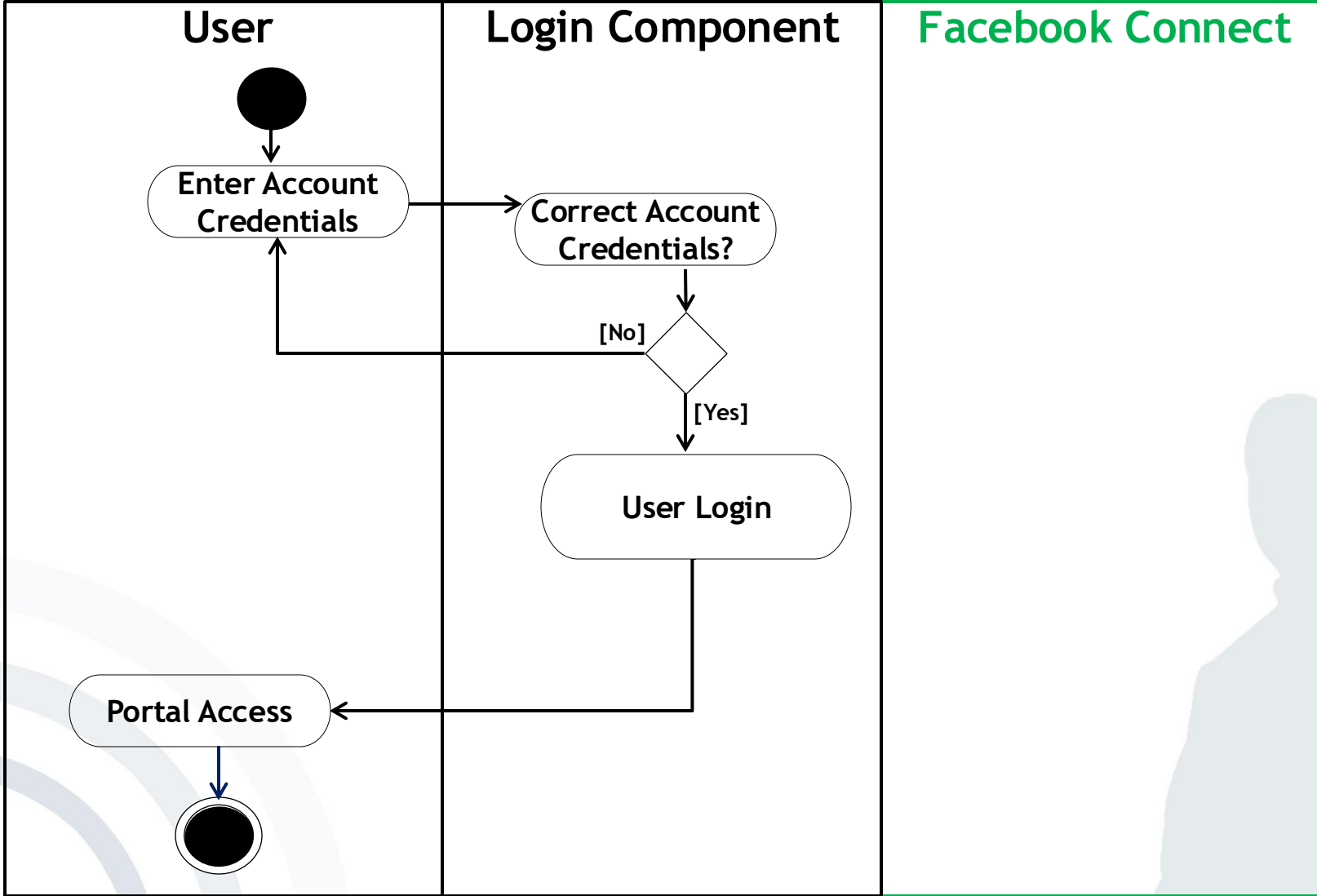


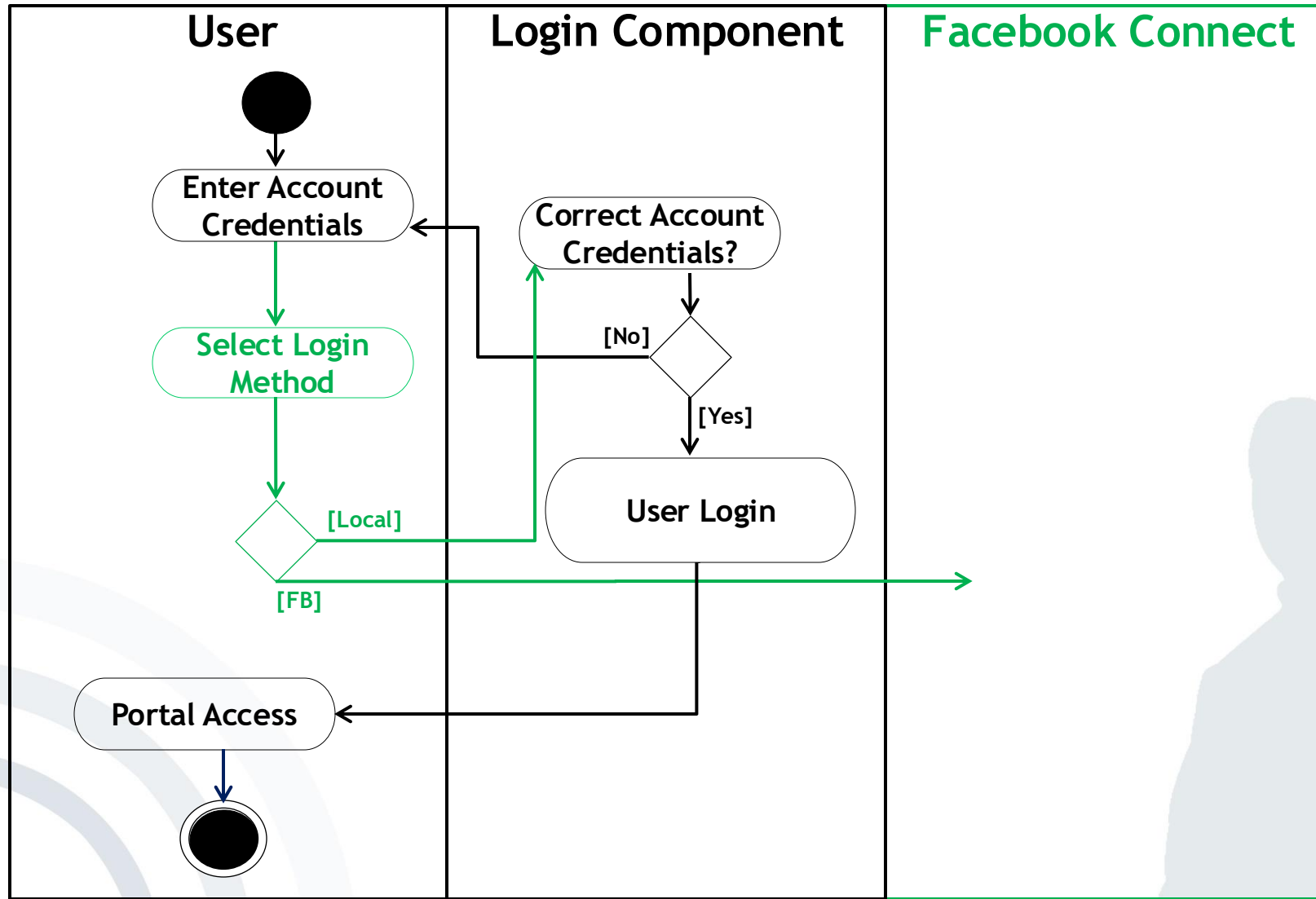


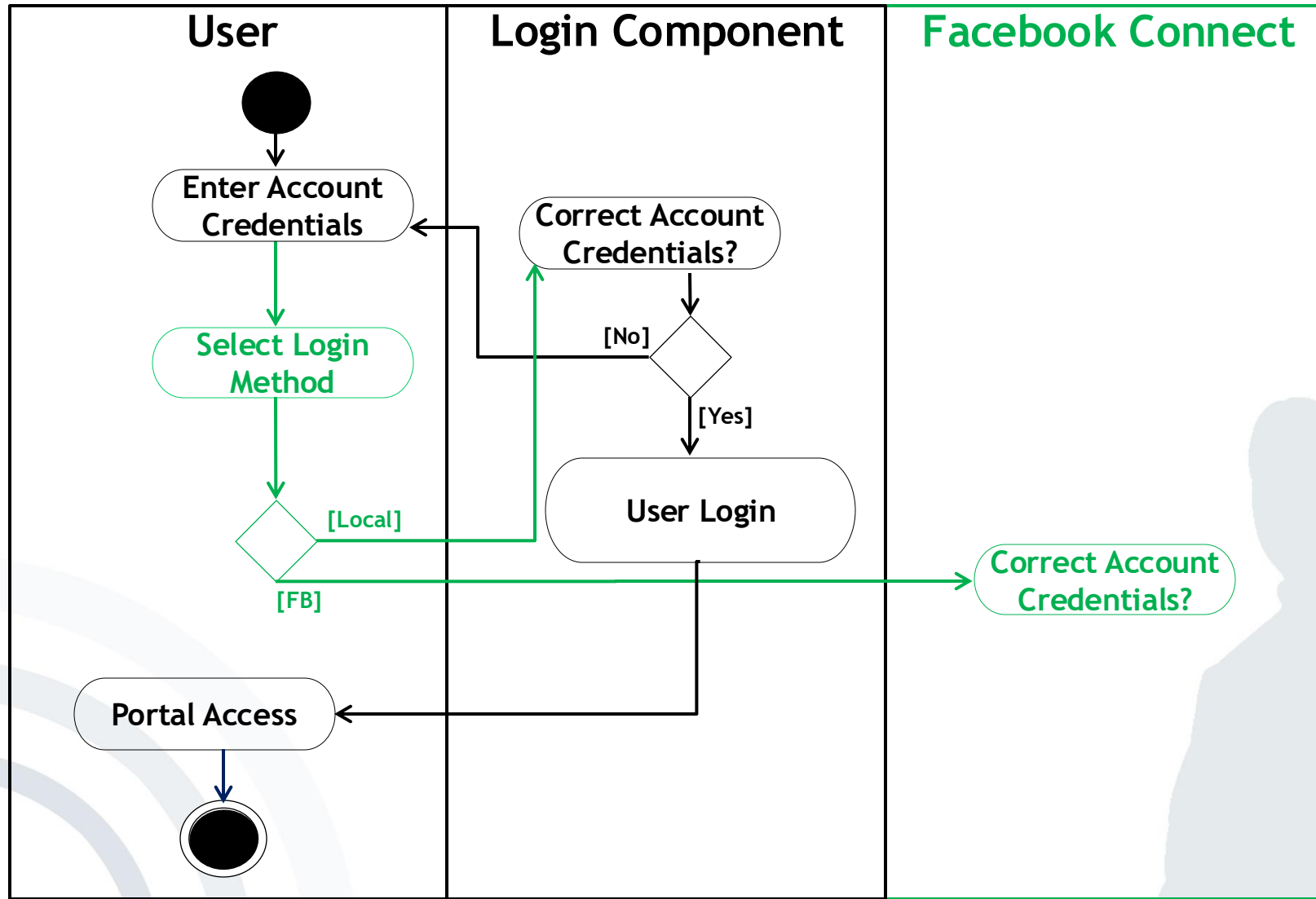
2.2 b) Additionally, your manager plans to integrate the Facebook login functionality into the myPlace Service. Model the corresponding extended login process by using the appropriate UML diagram.



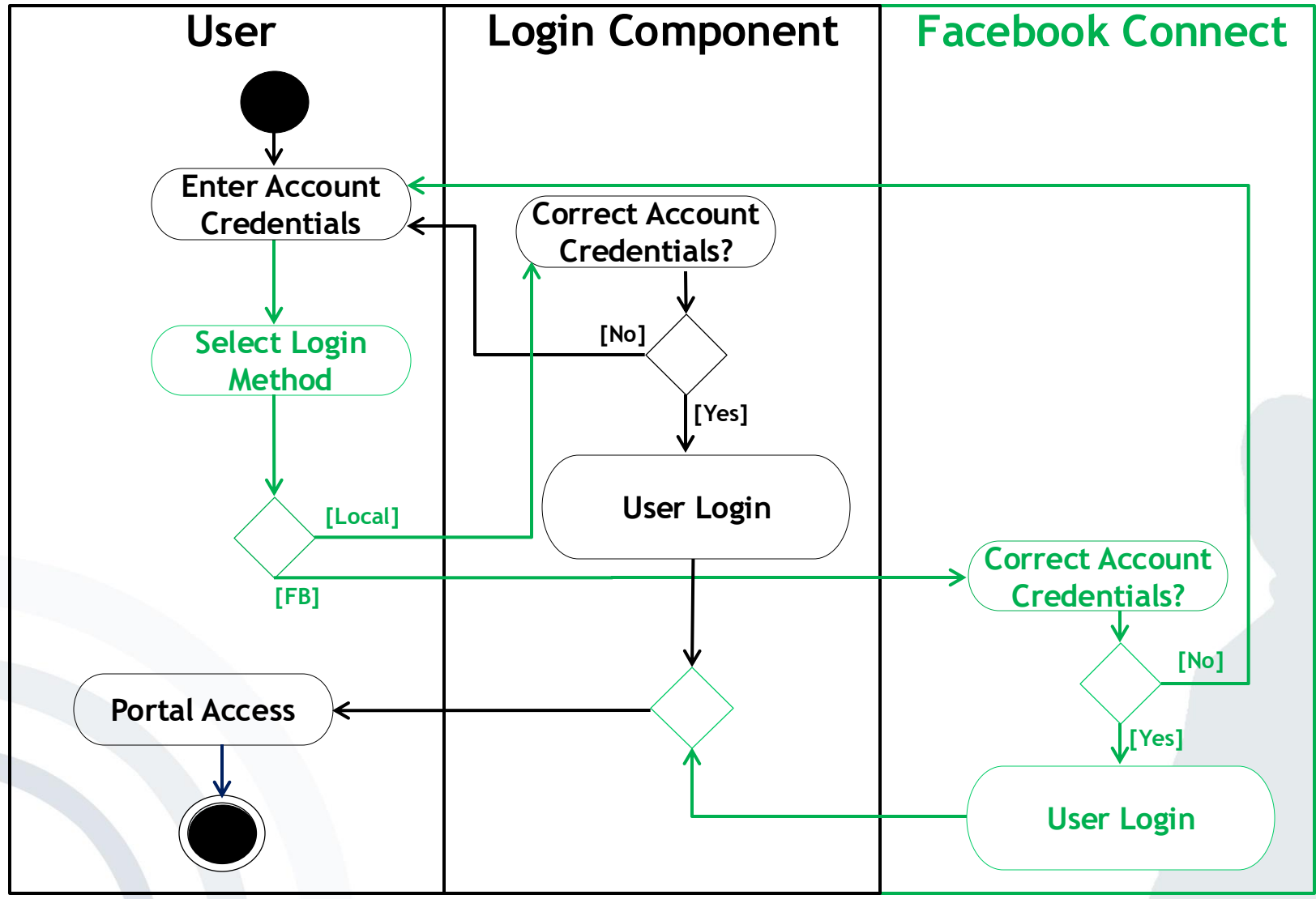












# Open Questions?

