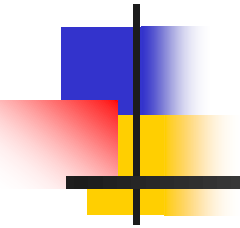
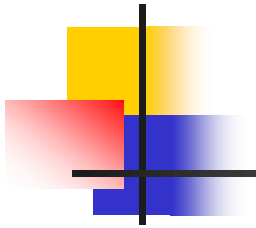
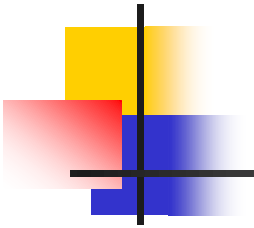


Using XML

The Ticket Booth System

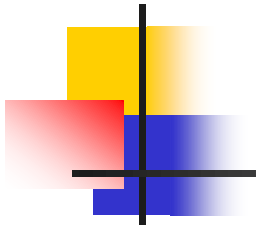


- We need a way to retain information between program runs.
- In real life, we would probably use a database system for this.
  - Beyond the scope of this course.
- We will use text files.



XML

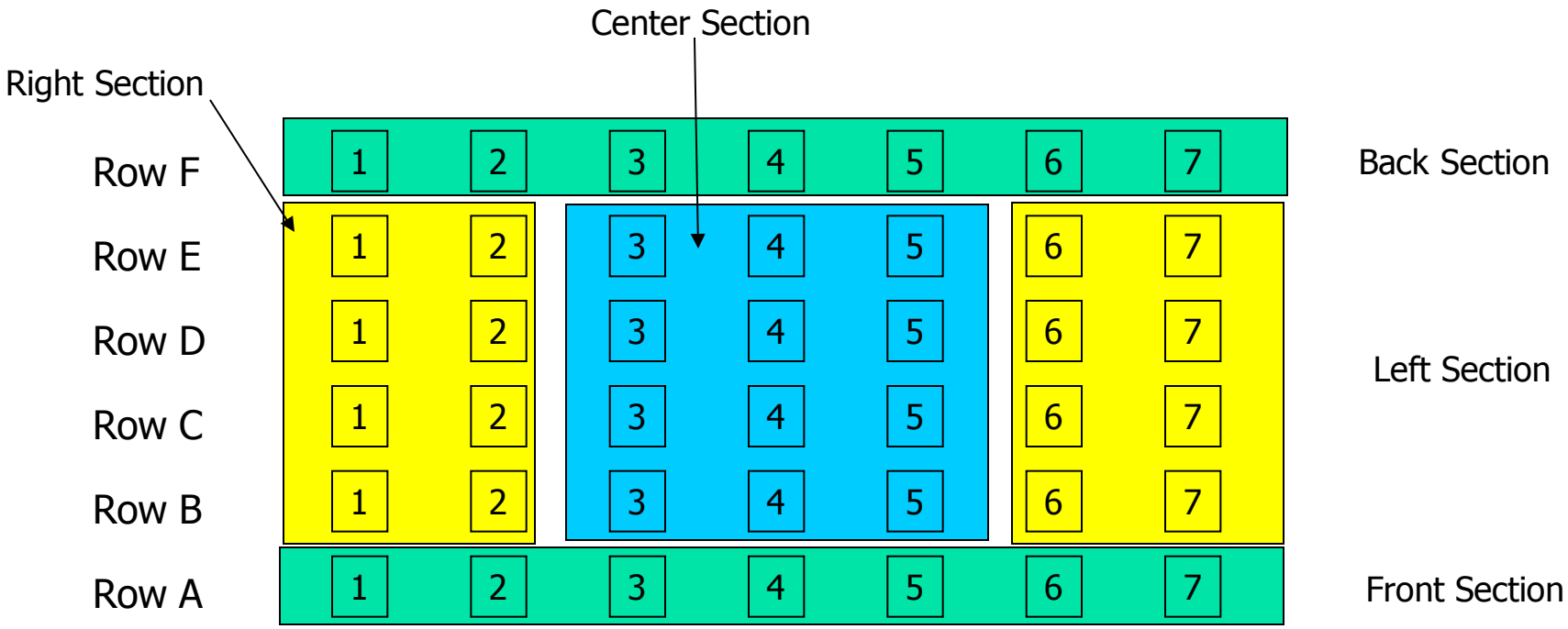
- Extensible Markup Language
- A metalanguage
  - Language used to describe languages
- Using XML we can create a markup language for a specific purpose.
  - Self describing.
  - Text based
  - System independent



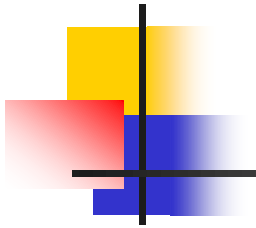
XML

- Like C++, XML is a big subject.
- Just a brief introduction in this course.
  - But enough to do useful work.

The Little Theater



Example: Venue.xml

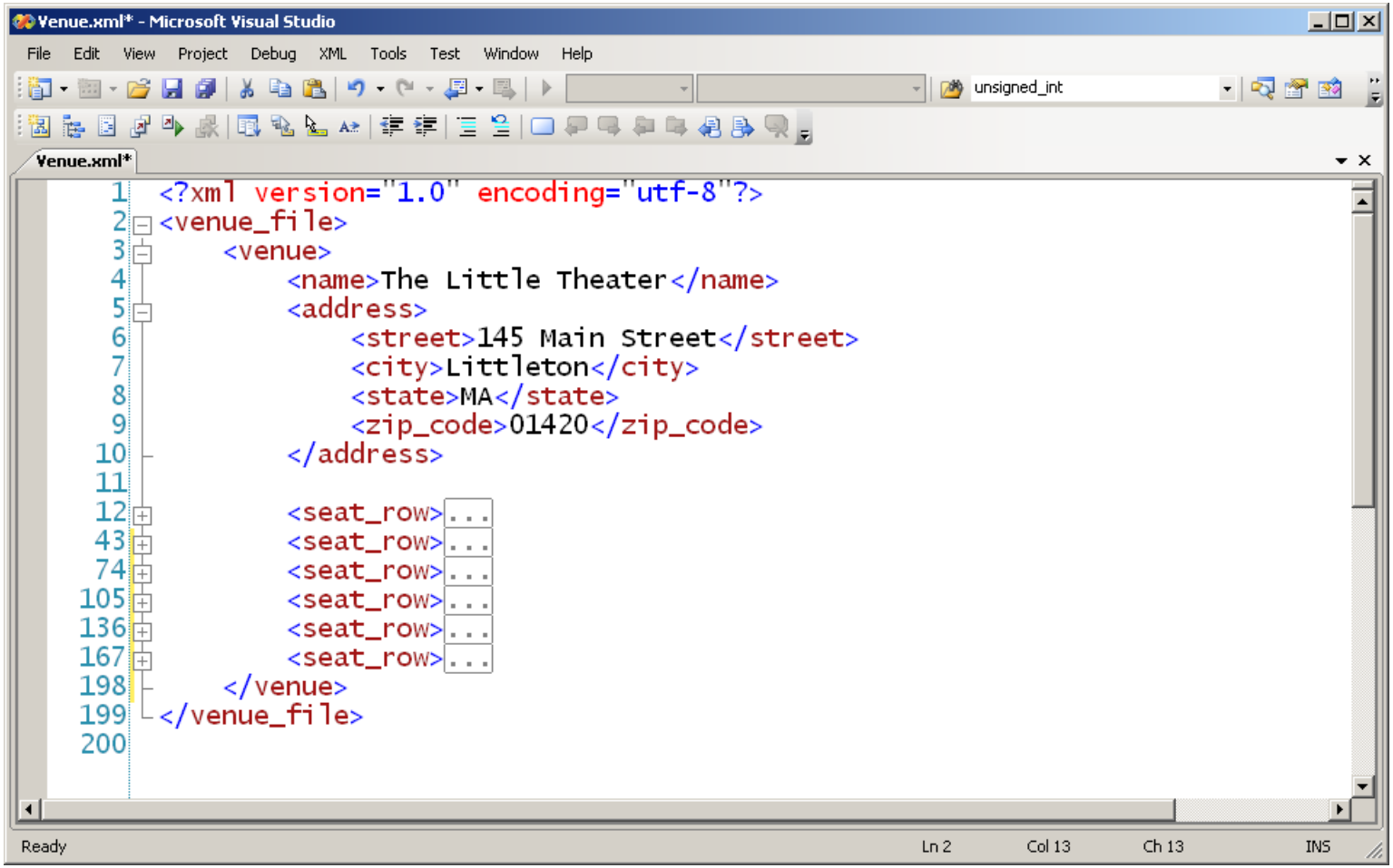


- Download:
- http://www.cse.usf.edu/~turnerr/Object_Oriented_Design/Downloads/2016_03_01_XML/Venue.xml

- Open in Visual Studio

  - Or you can view the file in any browser.

Venue.xml in Visual Studio



Things to Notice

- First line

```
<?xml version="1.0" encoding="utf-8"?>
```

  - Every xml file begins like this.

- The words in angle brackets are *tags*.
- Tags always come in matched pairs:
  - <xxx> ... </xxx>

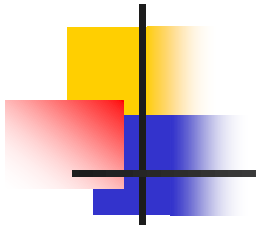
- Every well formed xml file has a single *root tag*.
  - <venue_file> in this case.

- Tags must be properly nested.

Things to Notice

- Everything between a start tag and its matching end tag is information about an object identified by the start tag.
  - Similar concept to objects in OOP.
- In Visual Studio, and other xml aware editors, we can collapse or expand the tags.
- There can be multiple instances of a tag name.

```
<seat_row> ... </seat_row>
<seat_row> ... </seat_row>
<seat_row> ... </seat_row>
```



XML Tag Names

- Tag names are similar to variable names in C++.

- Tag names are case sensitive.
- Cannot contain spaces, punctuation, etc.
- Letters, digits, and the underscore character.
  - First character cannot be a digit.

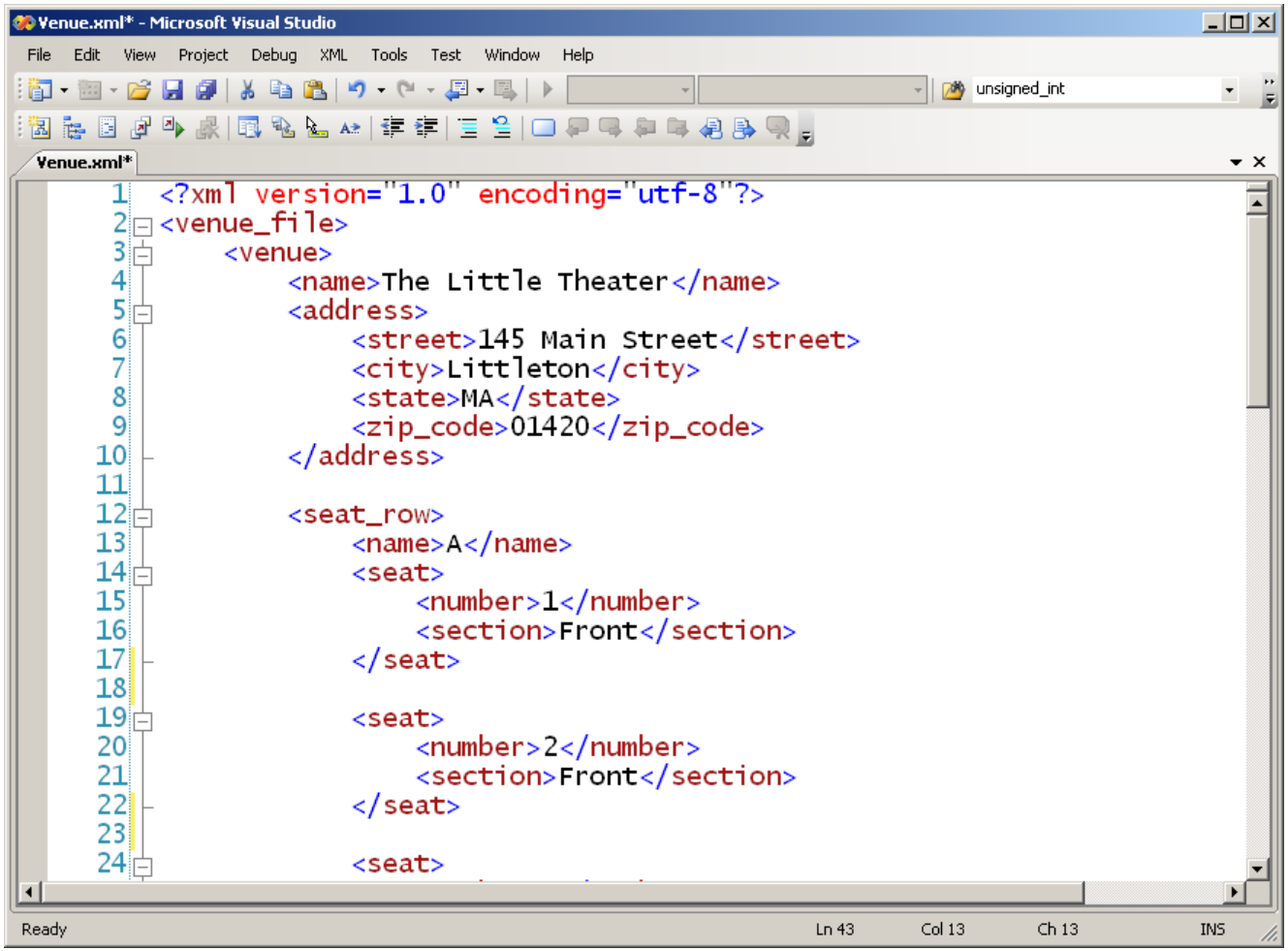
Comments

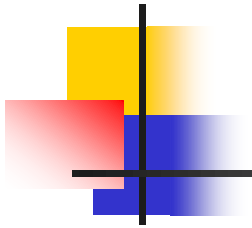
- XML files can include comments
  - Same as HTML

```
<!-- This is a comment -->
```

Comments can extend over multiple lines.

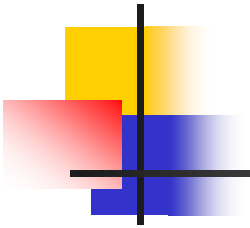
Seat Row


Venue.xml* - Microsoft Visual Studio
File Edit View Project Debug XML Tools Test Window Help
unsigned_int
Venue.xml*
1 <?xml version="1.0" encoding="utf-8"?>
2 <venue_file>
3 <venue>
4 <name>The Little Theater</name>
5 <address>
6 <street>145 Main Street</street>
7 <city>Littleton</city>
8 <state>MA</state>
9 <zip_code>01420</zip_code>
10 </address>
11
12 <seat_row>
13 <name>A</name>
14 <seat>
15 <number>1</number>
16 <section>Front</section>
17 </seat>
18
19 <seat>
20 <number>2</number>
21 <section>Front</section>
22 </seat>
23
24 <seat>
Ready
Ln 43
Col 13
Ch 13
INS



Describing a Seat Row

- A seat_row has:
  - A Name
  - An arbitrary number of Seats.
- Each seat has
  - A number
  - A section name



Using XML in a Program

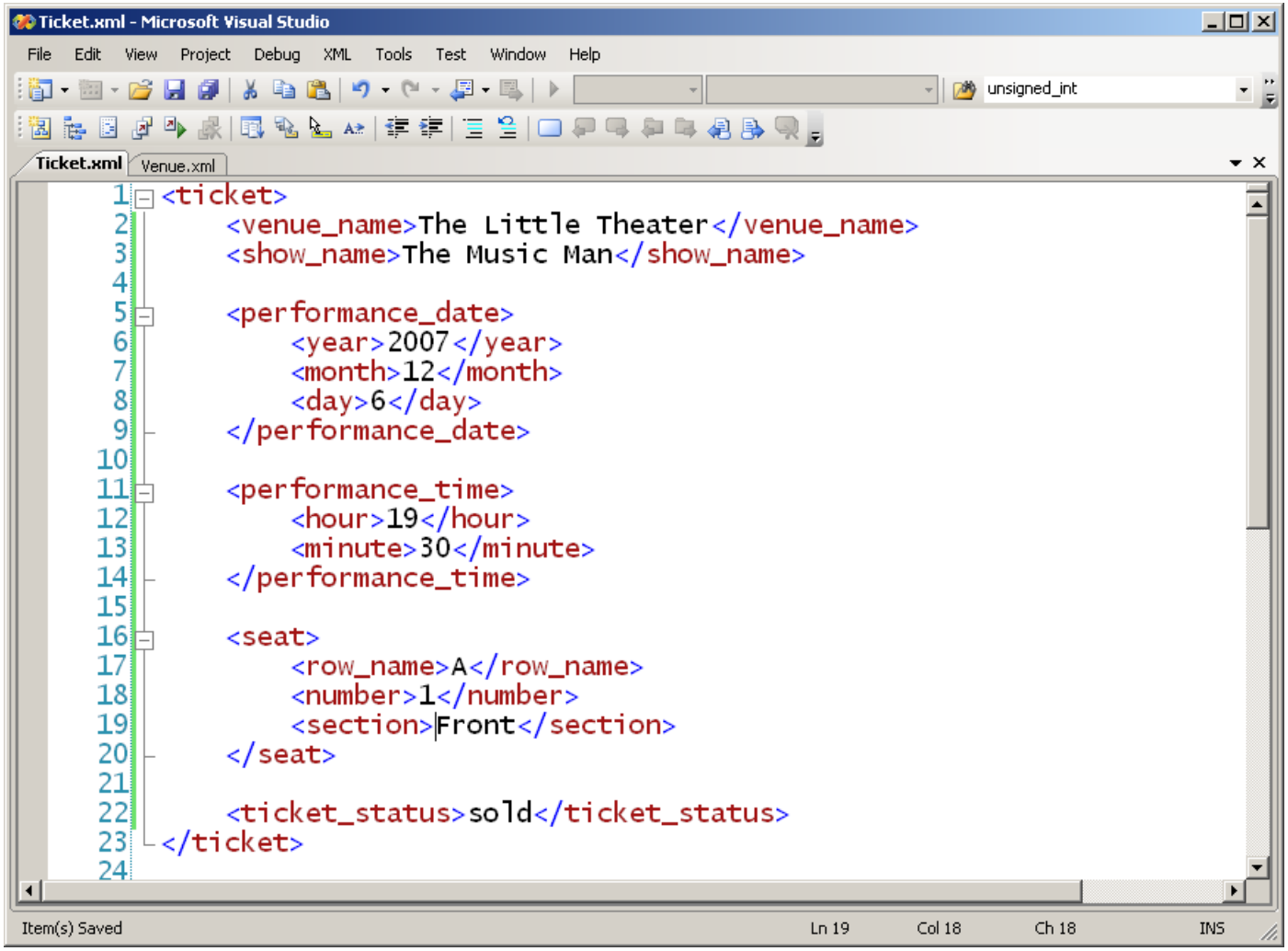
- We can write code to output objects to an XML file.
  - Similar to a Display method.
- Save objects on disk between program runs.
  - Serialization.
- Likewise, we can create objects using information read from an XML file.
  - Deserialization
- Need an XML *parser.*

Other XML Files

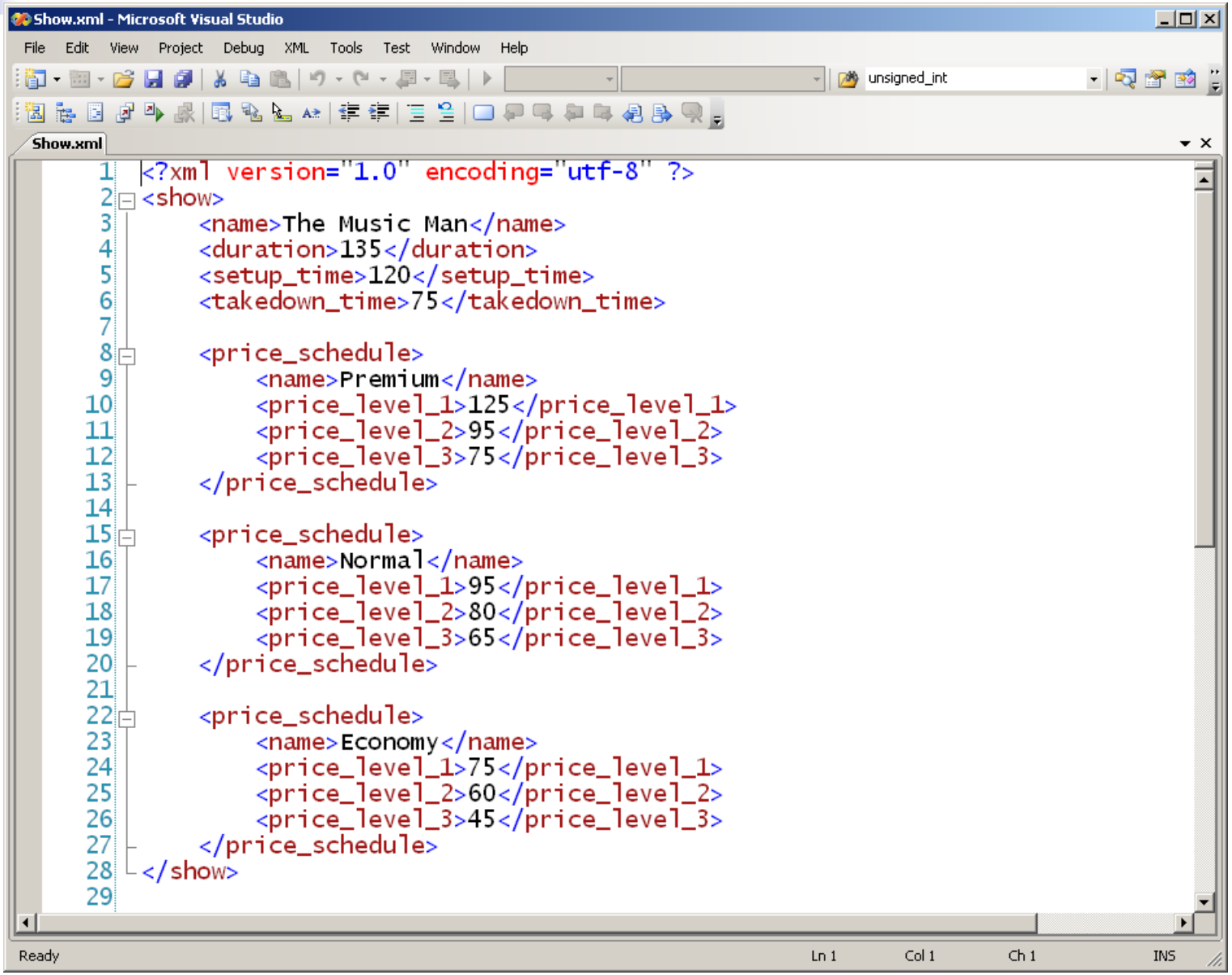
http://www.cse.usf.edu/~turnerr/Object_Oriented_Design/Downloads/2016_03_01_XML/Venue.xml

- Ticket.xml
- Show.xml
- Booking.xml

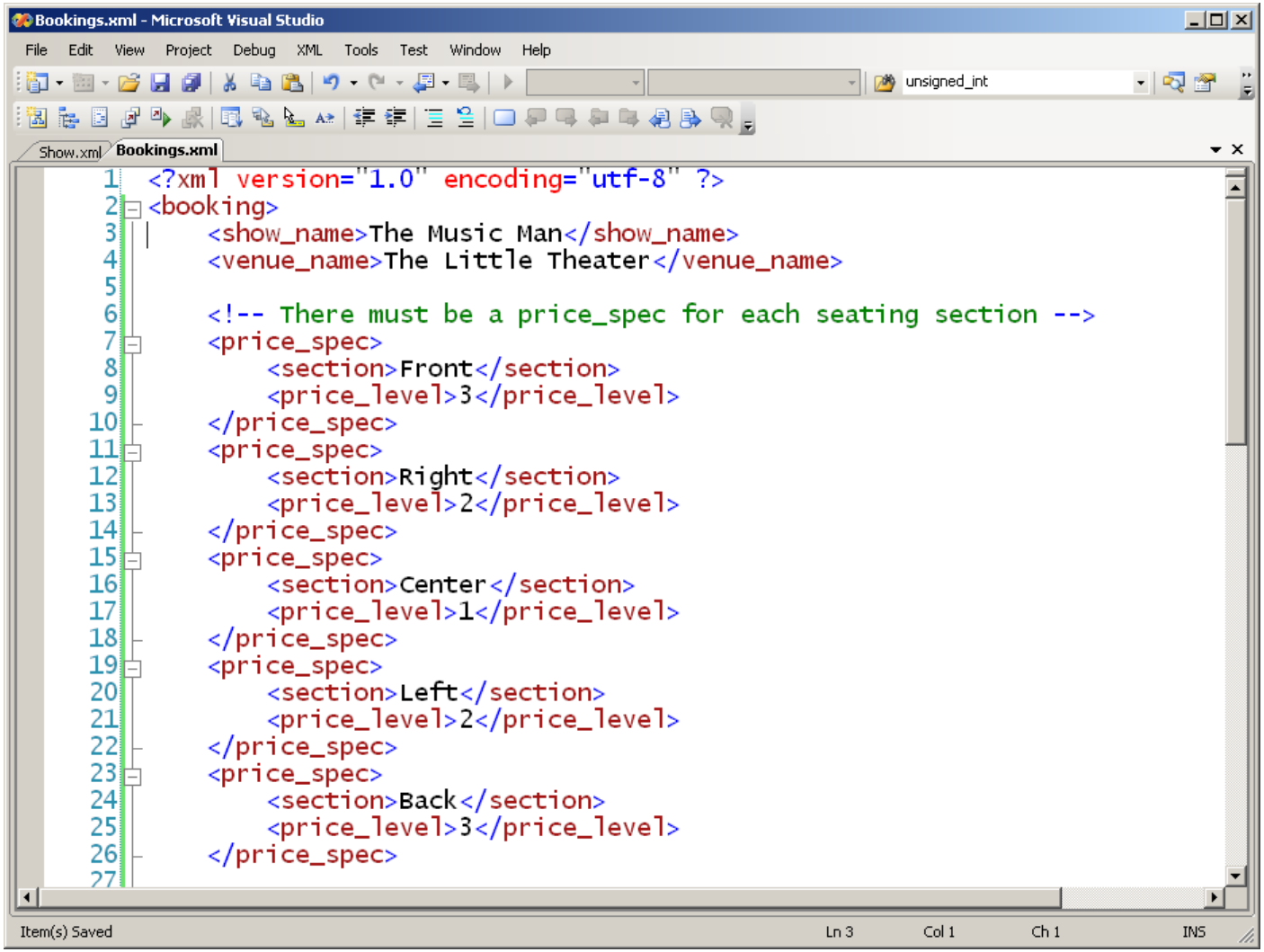
A Ticket in XML



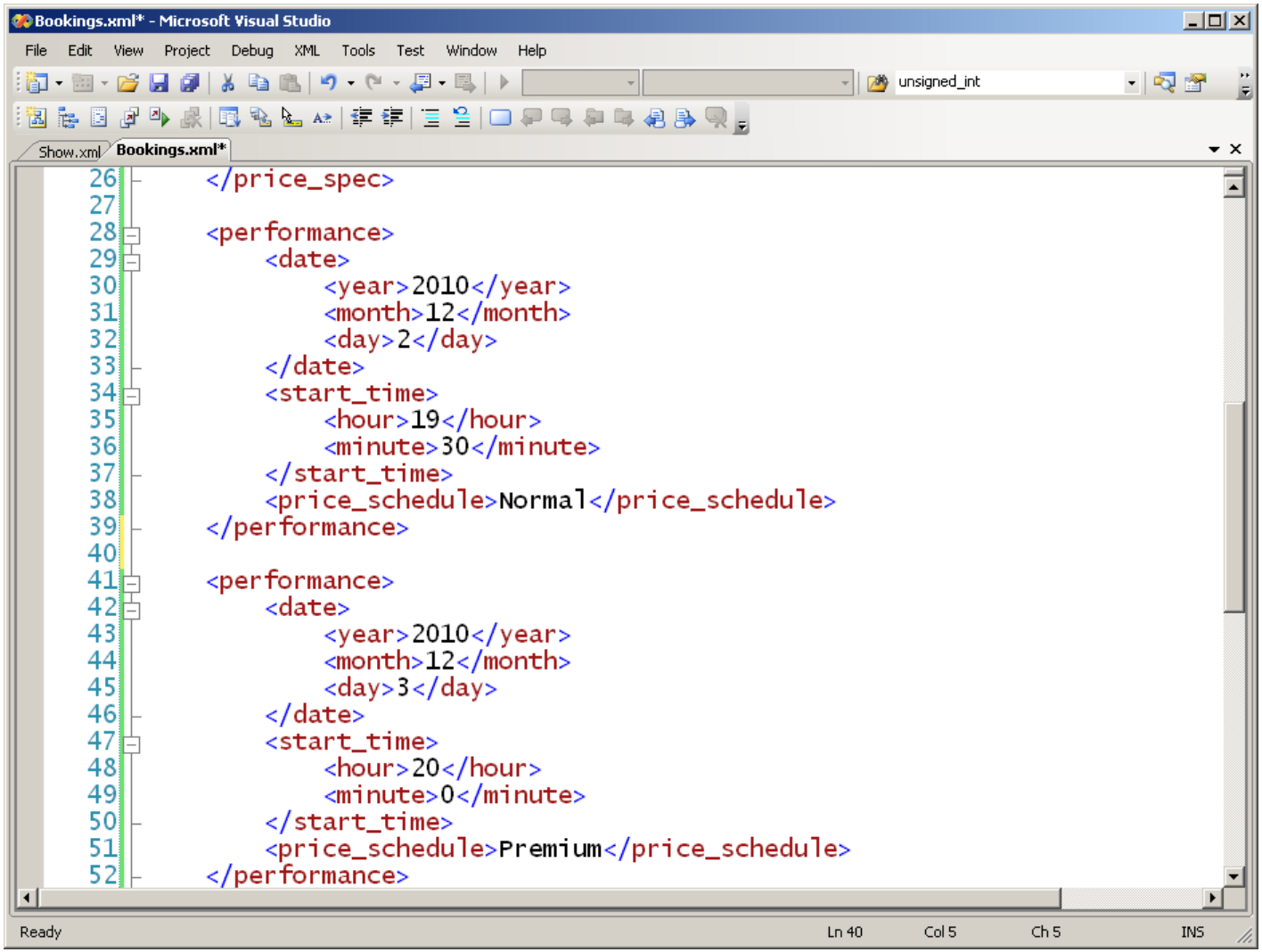
A Show in XML

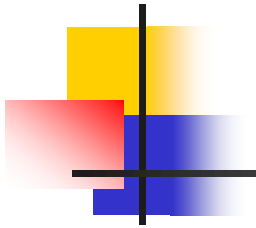

Show.xml - Microsoft Visual Studio
File Edit View Project Debug XML Tools Test Window Help
unsigned_int
Show.xml
1 <?xml version="1.0" encoding="utf-8" ?>
2 <show>
3 <name>The Music Man</name>
4 <duration>135</duration>
5 <setup_time>120</setup_time>
6 <takedown_time>75</takedown_time>
7
8 <price_schedule>
9 <name>Premium</name>
10 <price_level_1>125</price_level_1>
11 <price_level_2>95</price_level_2>
12 <price_level_3>75</price_level_3>
13 </price_schedule>
14
15 <price_schedule>
16 <name>Normal</name>
17 <price_level_1>95</price_level_1>
18 <price_level_2>80</price_level_2>
19 <price_level_3>65</price_level_3>
20 </price_schedule>
21
22 <price_schedule>
23 <name>Economy</name>
24 <price_level_1>75</price_level_1>
25 <price_level_2>60</price_level_2>
26 <price_level_3>45</price_level_3>
27 </price_schedule>
28 </show>
29
Ready
Ln 1
Col 1
Ch 1
INS

A Booking in XML



Booking (continued)





Exercise

- What will be the price of a ticket for seat B4 for the performance of the Music Man at the Little Theater on Dec. 2, 2010?

- Try to answer this on your own, before looking at the answer on the next slide.

Answer

- $95
- Venue
  - Seat B4 is in the Center section.
- Booking
  - The Center section will have price level 1
  - Dec. 2 will have the Normal price schedule.
- Show
  - In the Normal price schedule, level 1 is $95