Relevant Learning Outcomes (LOs)
This assignment assesses your ability to design, build and test ASP.NET MVC web sites using professional web development tools such as IDEs, HTML and CSS template engines, and Object-Relational Mapping software.

Pair Development
You are expected to work on this assignment with a partner. Please choose another student with comparable skills and background, and a compatible working style. You will submit your work jointly and receive the same mark. If you prefer to work on your own, or there is a problem with your partner, please contact me before the deadline so I can advise you on how to proceed.

Web Site Requirements
A system is required to allow on-line advertising of student accommodation. For this assignment, you must implement the following features:
- a landlord can enter a description of the accommodation, and upload one photograph of this
- the University accommodation officer can approve this, or reject it with a comment for the landlord
- landlords can view their advertisements to see which have been approved or rejected, and why
- students can view approved advertisements

You should design a suitable database structure and user interface to support these features. Note that you are implementing only a prototype or first iteration rather than a complete e-business solution. The majority of marks for this assignment are available for your correct and efficient use of the specified technologies and techniques, and your description and evaluation of these, rather than the delivered functionality.

Required Technologies and Techniques
You are required to implement this using recent versions of ASP.NET MVC, Razor, SQL Server, and the ASP.NET identity framework. You must also use Entity Framework Code First to develop your model and map this to your database structure, together with LINQ queries. Your site must provide multiple pages with professional layout and navigation, including appropriate CSS to provide a fluid response to changing screen sizes. Authentication must use “individual user accounts” and you must demonstrate authorisation based on both role and user ID. Validation of user entered data must occur on both the client- and server-side, but other than that no further client-side functionality is required.

It is recommended but not required that you develop your site with Visual Studio, IIS, and SQL Express.

Additional Technologies and Techniques
Pick one of the three numbered items below and apply this to your web site, making sure to generate appropriate supporting evidence to include in your documentation. Alternatively if there are other advanced technologies or techniques you would like to explore, please email me with your own suggestion(s), but make sure I have responded positively before you start work
1. database integrity through constraints, transactions, and automated migrations,
2. dependency injection and automated testing of model and business logic,
3. web performance measurement, including page size, load time, and memory usage.

Documentation
You should produce a PDF document describing your development. This must be no more than 2,500 words. Allowing for diagrams and other figures, this will be up 12 A4 pages, say. The document must include
• design diagrams showing the structure of your database, code, and web site
• appropriately clipped and labelled screen shots illustrating the implemented features
• samples of code, using appropriating formatting and colour, to confirm the technologies and techniques you used, and identifying which source code file the fragment is extracted from; and samples of mark-up you wrote yourself, each identifying which mark-up file it is extracted from; you should present these samples as figures, so that they do not count toward the word limit given above
• clear and concise explanations of these diagrams, screen shots, and code/mark-up samples
• how you tested your web site, for example that error messages appear appropriately, that reporting errors does not lose previous user input, and that the back button functions correctly
• how you tested portability, for example using different browsers, devices and screen sizes
• how you tested your business logic, for example to ensure that all grades are valid, and that descriptions and comments justifying rejection include at least 50 characters of text
• clarification of which additional or advanced technologies or techniques you used, including design diagrams, code fragments, other figures, and explanations as appropriate
• a critical evaluation discussing whether the ASP.NET tools, technologies and techniques you used were easy to learn, reliable, and effective in achieving their intended goals
• a comparative evaluation comparing ASP.NET with one other web development approach\(^1\) you could have used (such as Enterprise Java, OO PHP, Web Forms, or a single page Javascript application)
• a bibliography of all tutorials and textbooks you used to support your development, noting that your bibliography will not contribute toward the word limit given above

**Planning**

Assuming you spend 10 or more hours per week working on this assignment, it will take four to five weeks of elapsed time. If you have not used Visual Studio, .NET or C# before, you will first need to get up to speed with these technologies by working intensively with them in the first two weeks of term, say. If you have not used ASP.NET MVC previously, you will also need to allow extra time up front for reviewing the on-line tutorials and trying out some exercises before you start on the assignment itself. As you are working in pairs, you should adopt a code sharing platform which also allows you to revert to a previous version if necessary. You must not, however, publish your code where other students can see it. Finally, make sure you allow enough time at the end to produce the required documentation, most likely a whole week. Before doing so, you should identify appropriate tools to help you produce design diagrams, screen shots, and code fragments of suitable quality for including in your report.

**Submission Instructions**

Submit your design document in PDF format, and all files your ASP.NET project supporting files as a single archive in ZIP format\(^2\) to the electronic hand-in system by 4pm on the due date shown above.

**Marking Scheme**

There are three assessment criteria, each equally weighted:

1. required features, technologies and techniques
2. additional and advanced features and techniques
3. critical and comparative evaluation

Make sure your documentation covers each of these in sufficient detail so that your work is assessed fairly. In particularly note that features, technologies and techniques you have implemented but not explained, or explained incorrectly, will not gain credit. Likewise no credit will be awarded for features, technologies or techniques not mentioned in these instructions. The appendix overleaf has descriptions indicating the attributes typically associated with each grade.

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\(^1\) If you are not already familiar with one of these, you will need to research and investigate it first.

\(^2\) Make sure you avoid using an alternative archive format such as RAR.
Appendix

Assessment Criteria

The table below explains the assessment criteria. Please review these carefully before you start work, and again before you submit.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Required Features, Technologies &amp; Techniques</th>
<th>Additional &amp; Advanced Technologies &amp; Techniques</th>
<th>Critical &amp; Comparative Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A* (Excellent)</td>
<td>All required features were successfully implemented with correct and proficient use of the required technologies and techniques</td>
<td>A range of additional and advanced technologies and techniques were used correctly and proficiently</td>
<td>A clear evaluation with very good understanding, insight and supporting evidence</td>
</tr>
<tr>
<td>A (Very Good)</td>
<td>The required features were successfully implemented correctly and effectively using the required technologies and techniques</td>
<td>Additional and advanced technologies and techniques were used correctly and effectively</td>
<td>A clear evaluation with very good understanding with good insight and supporting evidence</td>
</tr>
<tr>
<td>B (Good)</td>
<td>The required features were successfully implemented using the required technologies and techniques</td>
<td>Additional and advanced technologies or techniques were used correctly and effectively</td>
<td>A clear evaluation which shows good understanding with some insight and supporting evidence</td>
</tr>
<tr>
<td>C (Satisfactory)</td>
<td>The required features were successfully implemented using some of the required technologies and techniques</td>
<td>Some additional or advanced technologies or techniques were used and made to work</td>
<td>Evaluation is clear, shows understanding, but only limited insight and/or supporting evidence</td>
</tr>
<tr>
<td>D (Marginal)</td>
<td>A partially successful attempt to implement the required features, technologies and techniques</td>
<td>A partially successful attempt to use additional or advanced technologies or techniques</td>
<td>Evaluation shows some understanding but lacks insight, supporting evidence, and/or clarity</td>
</tr>
<tr>
<td>F (Failing)</td>
<td>No evidence that the required features, technologies or techniques were used correctly</td>
<td>No evidence that additional or advanced technologies or techniques were used correctly</td>
<td>Evaluation is missing or shows little insight or understanding</td>
</tr>
</tbody>
</table>

Further Advice


If you have a Mac or other computer, here are some ways you could complete the assignment:

- Use the Windows PCs in the Zepler computing laboratory
- Choose a partner with a Windows PC and do pair programming
- Install Windows on your Mac, for example using Boot Camp
- Develop using a Windows Virtual Machine (VM)
- Develop using VS Code and test on a Windows VM, or using Microsoft Azure Cloud
- Use ASP.NET Core to allow a greater choice of web server