Software Development Life Cycle

- Operate and maintain the system
- Analyse user requirements
- Design the program
- Code the program
- Document and test the system

Image Source: http://www.technologyuk.net/
Overview

- Software Development
- Phases of Software Development
- Aspects of Software Quality
- Some Additional Online Resources
Software Development

- **Software Engineering**: study of the techniques and theory that support the development of high-quality software

- We have an entire course on this …

- End result: we are looking to meet the needs of the:
  - client (person or organization)
  - user (the people using the software)

- Why is this important for us in UNIV 103

Phases of Software / Systems Development Life Cycle (SDLC)

- Here is a typical list of what you are responsible for as a software developer: at some point you will be involved in some or all aspects of this development …

- Specification of the task – it doesn’t help if you are solving the wrong problem

- Design of a solution

- Implementation of the solution i.e. the code

- Testing and Analysis of the solution
  - A unit test checks to see if a method works as expected all by itself.
  - An integration test checks to see if a method works in combination with other methods – and test for any undesirable side effects

- Debugging

- Maintenance and evolution of the system
SDLC – arrows ....

- Specifications
- Design
- Documentation
- Update/Maintenance
- Code
- Test
- Debug
Phases of Software Development: Design

“You’ve got to be very careful if you don’t know where you’re going, because you might not get there.” ~ Yogi Berra

- There are different techniques to design methods/solutions for new software, e.g.
  - top-down
  - bottom-up

- Common tools for computer scientists and engineers include:
  - flowcharts,
  - pseudocode

- Objects are chosen from
  - libraries or
  - methods for new objects must be implemented.
Phases of Software Development: Code

- … and only then do you begin to code

Lifelong Resources
- Best practices you are learning in all your classes

- Always be on the lookout for additional resources e.g.
  - established forums (specific forums for specific aspects of CS)
  - reference books (look through reviews)
    - The Mythical Man-Month: Essays on Software Engineering
  - free online books/ white papers
    - ACM
    - IEEE

- The clearer your understanding of the problem or specification/ the better your design will be/ and the better your coding will be … the better the …
Phases of Software Development: Documentation

- Throughout the entire process …
## Aspects of Software Quality: endgame is a quality product

<table>
<thead>
<tr>
<th>Quality Characteristic</th>
<th>Description</th>
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<tbody>
<tr>
<td>Correctness</td>
<td>The degree to which software adheres to its specific requirements.</td>
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<tr>
<td>Reliability</td>
<td>The frequency and criticality of software failure.</td>
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<tr>
<td>Robustness</td>
<td>The degree to which erroneous situations are handled gracefully.</td>
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<tr>
<td>Usability</td>
<td>The ease with which users can learn and execute tasks within the software.</td>
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<tr>
<td>Maintainability</td>
<td>The ease with which changes can be made to the software.</td>
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<tr>
<td>Reusability</td>
<td>The ease with which software components can be reused in the development of other software systems.</td>
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<tr>
<td>Portability</td>
<td>The ease with which software components can be used in multiple computer environments.</td>
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<tr>
<td>Efficiency</td>
<td>The degree to which the software fulfills its purpose without wasting resources.</td>
</tr>
</tbody>
</table>

**FIGURE 1.1** Aspects of software quality
Some (of the many) Additional Online Resources

- www.youtube.com/watch?v=qa-byyTWhPg