Software Development Life Cycle

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

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 ....

1. Specifications
2. Design
3. Documentation
4. Update/Maintenance
5. Code
6. Test
7. Debug
"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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<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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<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>
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</tbody>
</table>

**FIGURE 1.1** Aspects of software quality
Software Life Cycle

Dr. Nazli Hardy

UNIV 103

How the customer explained it
How the Project Leader understood it
How the Analyst designed it
How the Programmer wrote it
How the Business Consultant described it

How the project was documented
What operations installed
How the customer was billed
How it was supported
What the customer really needed
Some (of the many) Additional Online Resources

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