
Introduction to Multimedia Computing

Lecturer: *Fiona Yan Liu*

Lecture 01: *Jan 15, 2010*

Outline of Lecture 01

- Introduction to multimedia technology
 - Definition of multimedia
 - History of multimedia
 - Technology of multimedia
 - Introduction to COMP319
 - General information
 - Subject learning outputs
 - Course assessment
 - Course arrangement
 - Introduction to HTML
 - Consulting time for the course add/drop
-

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Motivation of Study Multimedia

- Consistent with human's perception
 - We perceive the world through all the senses we have at once
 - The integration of media is natural
- Multimedia technology intends to imitate the human's communication with the world
 - Drama is an typical example of multimedia
 - The separation of media is artificial and may often unsatisfactory
- Multimedia is not only the reversion of the real life but also the creation

Definition of Multimedia

- Different people have different viewpoints
 - Multimedia has pervaded the world of entertainment, education, and business
- Multimedia from the user's perspective
 - Enables information to be represented through text, audio, graphics, image, animation, and video
- Multimedia in computer science
 - Computer-based processing of the data includes at least two of the following elements:
Text, audio, graphic, image, animation, and video

History of Multimedia Technology

- Newspapers (First)
 - Mass communication medium using text, images, and graphics
 - The connection between computer and multimedia is a short period
 - Memex from Vannevar Bush (1945)
 - CD-ROM specification was published (1985) and then appear on desktop in 1989
 - Hypertext markup language (HTML) was invented (1990)
 - MPEG-1 was approved (1991)
 - JPEG was approved (1992)
 - World Wide Web (WWW) became publicly available (1992)
 - Netscape program was created (1994)
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Multimedia Technology

- From the data
 - Text and hypertext
 - Audio
 - Graphics and animation
 - **Image and video**
- From the target
 - **Multimedia data generation**
 - Multimedia data management
 - Multimedia data transmission
- From the system
 - Hardware
 - **Software**

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General Information

- Lecture
 - Lecturer: Fiona Yan Liu
 - Contact: csyliu@comp.polyu.edu.hk
- Lab
 - Teaching Assistant: David Lo
 - Contact: cswylo@comp.polyu.edu.hk
- Quiz grading
 - Teaching Assistant: Starry Shenghua Zhong
 - Contact: csshzhong@comp.polyu.edu.hk
- Text book
 - Z.-N. Li and M.S. Drew, "Fundamentals of Multimedia", Prentice-Hall, 2003.
- Course web page
 - <http://www.comp.polyu.edu.hk/~csyliu/course/comp319/main.html>
 - Check at least once a week for the new announcement

Subject Learning Outputs

- Basic knowledge for multimedia computing
 - Learn from the lecture
 - Assessed by the final examination
- Basic programming skill for multimedia data
 - Learn from the lab
 - Assessed by the second course project
- Basic learning ability for multimedia software
 - Self-study and attend course presentation
 - Assessed by the first course project

Syllabus of the Lecture

- Basic part
 - Hypertext representation
 - Text compression
 - Image data representation
 - Image data compression
 - Video data representation
 - Video data compression
 - Audio data representation
 - Audio data compression
 - Optional part
 - Multimedia data management
 - Challenges in multimedia computing
-

Course Assessment

- Final examination ~ 45%
 - Covers basic part of the syllabus
 - Individual work
- Continuous assessment ~55%
 - Ten quizzes ~ 20%
 - Course project 1 ~ 15%
 - Introduction of multimedia software
 - Group work with 1 ~ 4 person(s) each group
 - Group members get the same score in this project
 - Course project 2 ~ 20%
 - Video frames compression using Matlab
 - Same group with first course project

Further Arrangement

- Lab in next week
 - Lab1 Introduction to Matlab
 - Teaching assistant David Lo
- Lecture in next week
 - Lecture 2 Color model and human vision
 - Lecturer Fiona Yan Liu
- What you should do before next Wed Jan 20
 - Send Group information to Starry Shenghua Zhong by email csshzhong@comp.polyu.edu.hk
 - Include group member's name, student ID, E-mail

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Definition of HTML

- HTML

- Hypertext Markup Language

- Markup Language

- Allows regular text to be marked with special symbols, that tells a program, how to display the text

- Example: `<l>Hello</l>`

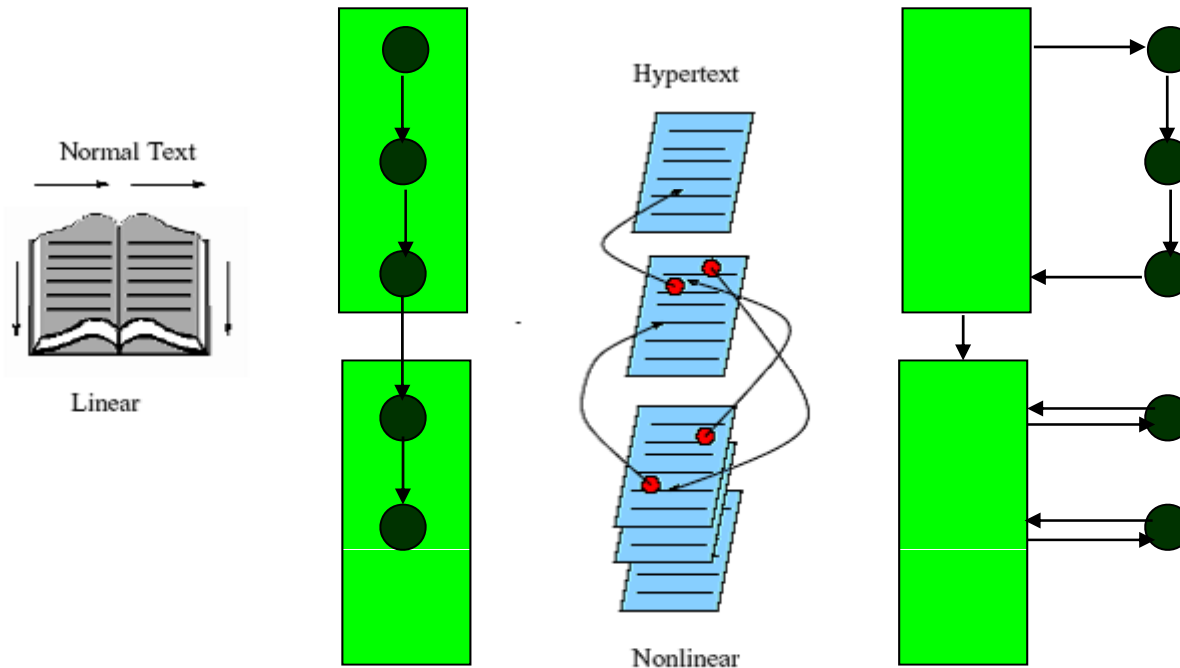
- Hypertext

- Normal text: to be linear

- Hypertext: not constrained to be linear

Hypertext and Normal text

- Hypertext is text, which contains links to other texts.



Web Generation

- HTML documents are plain-text (also known as ASICC) files that can be created using any text editor
- WYSIWYG editors
 - What you see is what you get
 - Microsoft FrontPage
- The difference between the htm and html extensions
 - Depend on author's personal preference

An Example of HTML Document

```
<html>
```

```
<head>
```

```
<TITLE>A Simple HTML Example</TITLE>
```

```
</head>
```

```
<body>
```

```
<H1>HTML is Easy To Learn</H1>
```

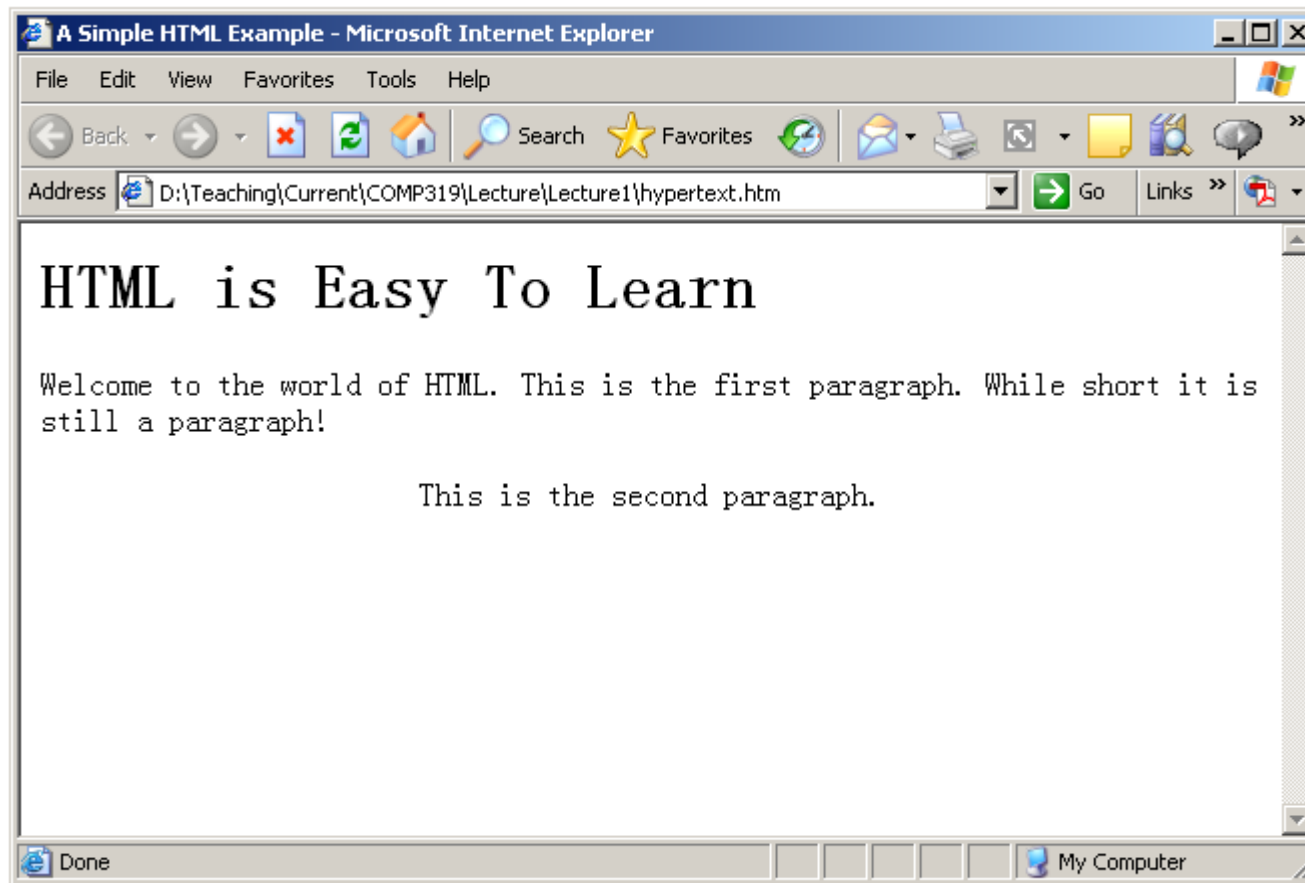
```
<P>Welcome to the world of HTML. This is the first paragraph. While short it is still a  
paragraph!</P>
```

```
<P Align = center >This is the second paragraph.</P>
```

```
</body>
```

```
</html>
```

Web Generation using HTML Document



The Minimal HTML Document

- Each html document consists of head and body text
 - Components of html document
 - Elements
 - Tags
 - Consist of: < tag name >
 - Tags are usually paired: <P> </P>
 - Attribute
 - For more information, please check the tutorial
 - <http://www.w3schools.com/html/default.asp>
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2D DCT and IDCT with 8*8 Numbers

- Consider an image of (8*8)
- 2D DCT

$$F(u, v) = \frac{C(u)C(v)}{4} \sum_{i=0}^7 \sum_{j=0}^7 \cos \frac{(2i+1)u\pi}{16} \cos \frac{(2j+1)v\pi}{16} f(i, j)$$

- 2D IDCT

$$\tilde{f}(i, j) = \sum_{u=0}^7 \sum_{v=0}^7 \frac{C(u)C(v)}{4} \cos \frac{(2i+1)u\pi}{16} \cos \frac{(2j+1)v\pi}{16} F(u, v)$$