Network Simulation and Testing

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Vital Information

- Course   :網路模擬與測試
- Taught by   :黃寶儀
- Class No.   : 921 EU7400
- Credit   : 3 units

For Some of You

- The first non-English course taught in English
- All communication in English, including
  - Lectures
  - Homework
  - Exams
  - In/off-class interaction

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Be Aware

- Homework and exams are accepted only in English
- Credits are granted only when the English is comprehensible

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Though to avoid confusion…

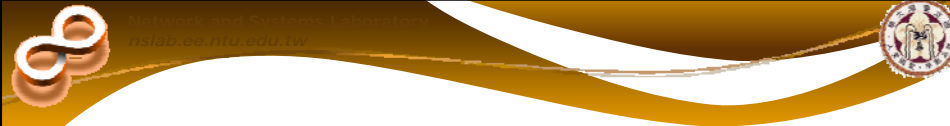- Please make sure your names are clearly written in Chinese.

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Think of it this way:

I get to be an exchange student without going physically abroad.

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Some Suggestions

- Read the corresponding material/slides before a lecture

- Lectures **will not** be recorded this semester
  - Recordings from previous years are available in mp3 format

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Today

Class admin

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Roadmap

- **The essentials**
- Administrative Information
- Content
  - Course objective and scope
  - Syllabus
- Your responsibility
  - Homework
  - Exams
- Grading policy
- Class material

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The Essentials

- Course page
  - http://nslab.ee.ntu.edu.tw/courses/net-simtest-spring-08/

- Polly Huang
  - http://cc.ee.ntu.edu.tw/~phuang
  - Click the 'Teaching' link
  - Then, click the 'Spring 2008' link
  - Under the 'Network Simulation and Testing' category

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Roadmap

- The essentials
- **Administrative Information**
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- Your responsibility
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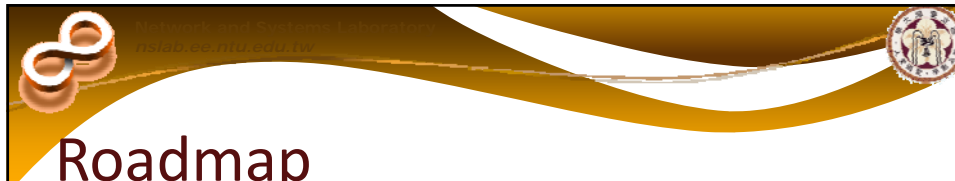 - Exams
- Grading policy
- Class material

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Location and Time

- Location
  - BL-114 (for lectures)
  - EEII-132 (for labs)
- Time
  - Friday, 9:10-12:10
  - 2 breaks
    - 10:00-10:20
    - 11:10-11:20
  - Please note that during the breaks the priority goes to the calls of nature.
  - Questions will be addressed afterwards.

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The Instructor

- Polly Huang
  - Office: BL-613
  - Phone: 33663599
  - Email: phuang@cc.ee.ntu.edu.tw
  - Homepage: http://cc.ee.ntu.edu.tw/~phuang

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Office Hour

- By appointment
- Vote for a common off hour slot next week

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Background Knowledge

- Advanced courses on data networks

- There will be networking terms that I assume you have learned about at some point.
- The tools are all data network specific. You'll definitely need to know how the TCP/IP network works and the advanced research-oriented ideas.
- This will be a difficult course if you do not have sufficient background. (You are welcome to sit in.)

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Software Skill
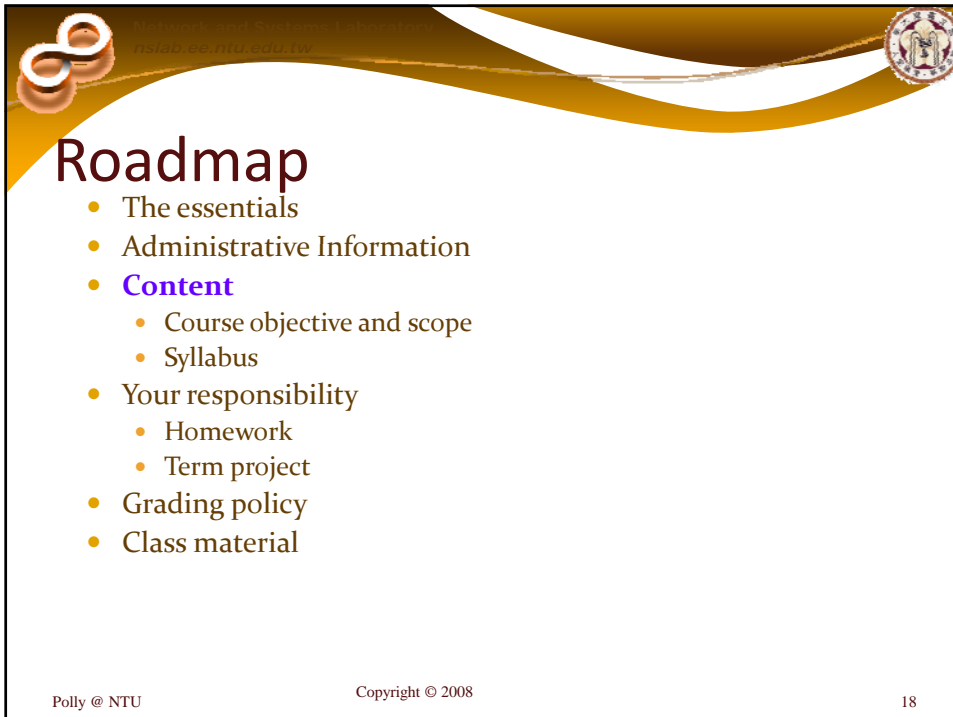
- Unix!
- C/C++
- Experience with scripting languages

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Equipment Requirement

- A laptop/PC of your manipulation
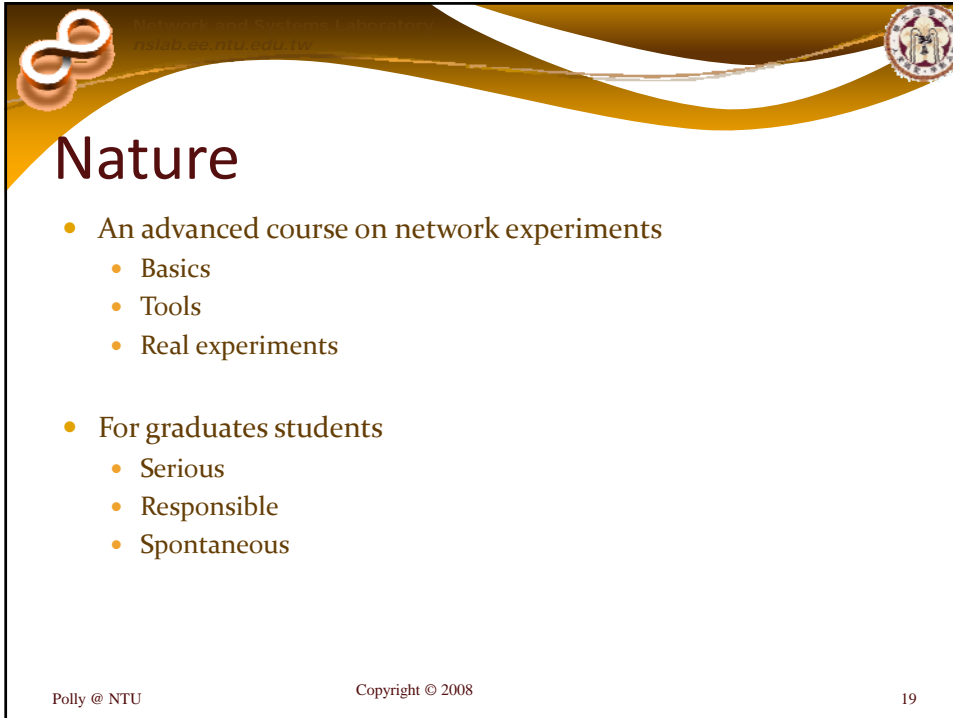 - Installing FreeBSD
  - Installing tools
  - Doing homework

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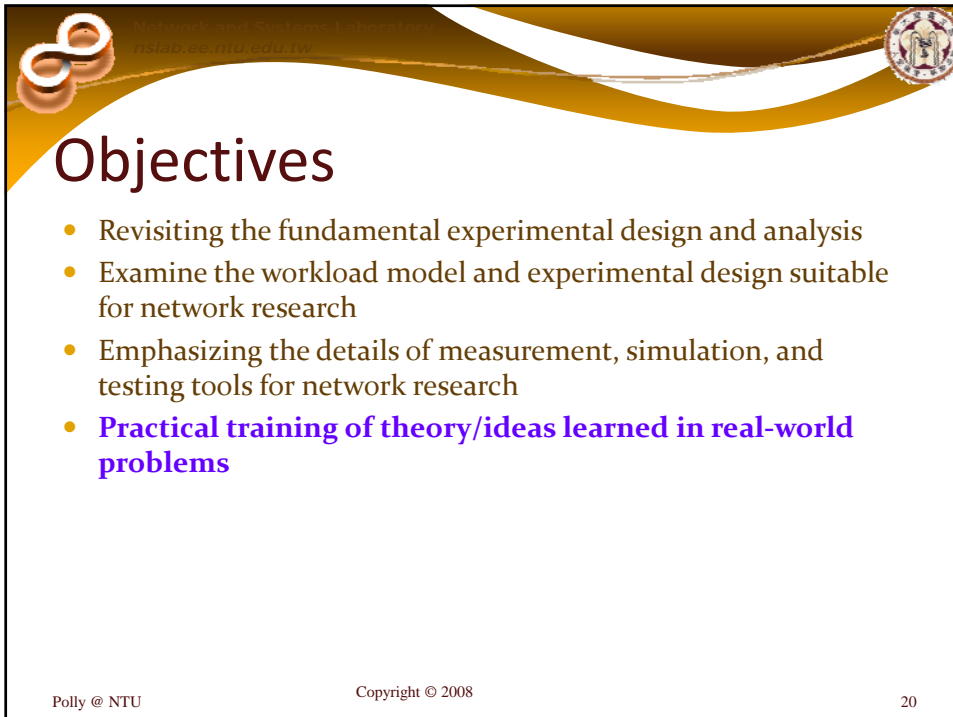 - Term project
- Grading policy
- Class material

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Nature

- An advanced course on network experiments
  - Basics
  - Tools
  - Real experiments

- For graduates students
  - Serious
  - Responsible
  - Spontaneous

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Objectives

- Revisiting the fundamental experimental design and analysis
- Examine the workload model and experimental design suitable for network research
- Emphasizing the details of measurement, simulation, and testing tools for network research
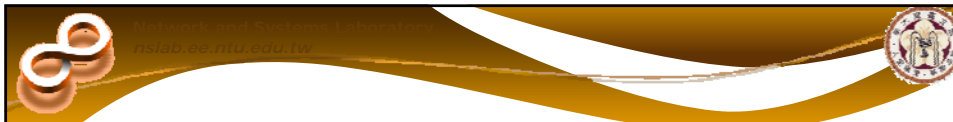- **Practical training of theory/ideas learned in real-world problems**

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Scope

- The network experiments
  - Performance evaluation in general
  - The target system, i.e. p2p and sensor networks
    - The system
    - The workload
    - The metrics
  - The tools
    - ns-2
    - dummynet
    - tcpdump and libpcap
    - PlanetLab

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Syllabus: Part I

- 02/22 Admin
- 02/29 Overview: Analyzing the Internet
      (HW#1: FreeBSD due 12:30)
- 03/07 Workload: Traffic
- 03/14 Workload: Topology
      (HW#2: Paper Review #1 due 00:00)
- 03/21 Case Studies, Peer-to-Peer Networks
- 03/28 Case Studies, Sensor Networks
      (HW#3: Paper Review #2 due 00:00)

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Syllabus: Part II

- 04/04 No Class (Make-UP Class Later)
- 04/11 Project proposal presentations
- 04/18 ns-2 I
- 04/25 ns-2 II
    (Project Proposal due 00:00)
- 05/02 ns-2 III
    (HW#4: ns-2 lab 1 due 12:30)
- 05/09 ns-2 IV
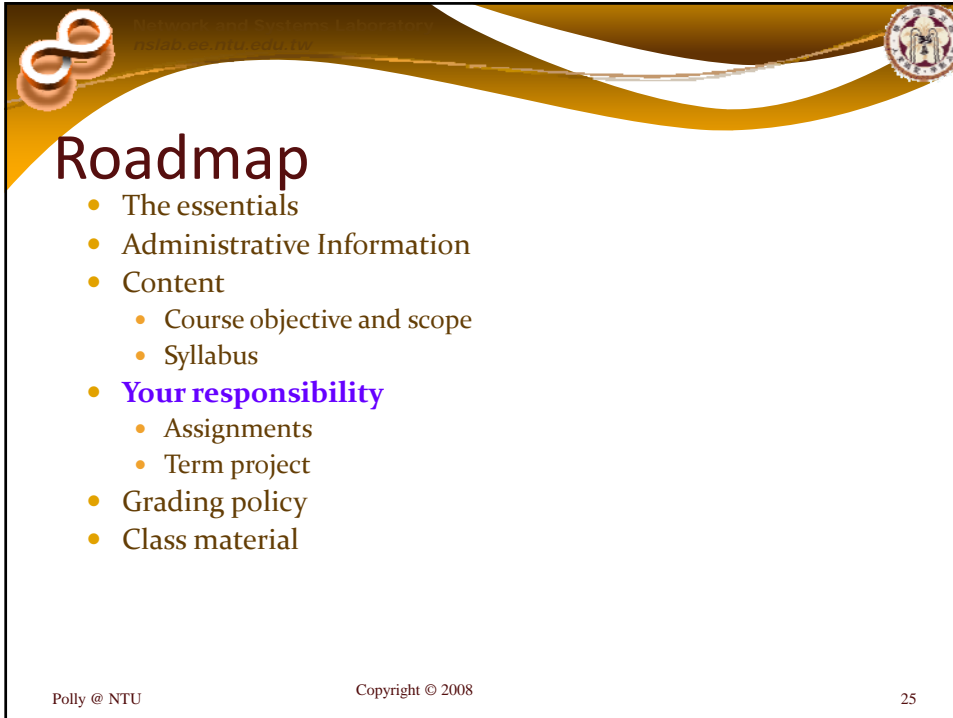- 05/16 tcpdump I
    (HW#5: ns-2 lab 2 due 12:30)

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Syllabus: Part III

- 05/23 tcpdump II
- 05/30 dummynet I
    (HW#6: tcpdump lab due 12:30)
- 06/06 dummynet II
- 06/13 PlanetLab I
    (HW#7: dymmynet lab due 12:30)
- 06/xx PlanetLab II (Make-up Class)
- 06/20 Project Presentation
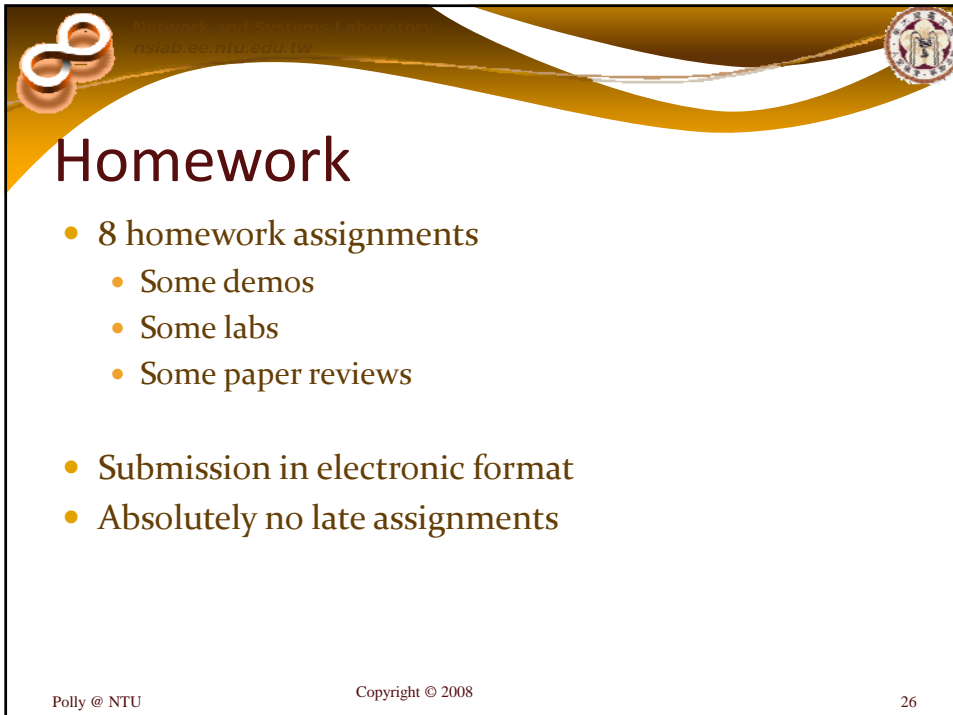   (HW#8: PlanetLab lab due 12:30, report due 00:00)

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Roadmap

- The essentials
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  - Assignments
  - Term project
- Grading policy
- Class material

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Homework

- 8 homework assignments
  - Some demos
  - Some labs
  - Some paper reviews

- Submission in electronic format
- Absolutely no late assignments

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Term Project

- Research-oriented exercise
- Research cycle
  - Literature review
  - Problem definition
  - Comparison
  - Potential ways to improve
  - Experimental design
  - Analysis
  - Presentation

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Term Project

- Research-oriented exercise
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  - Experimental design
  - Analysis
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Our Emphasis

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To Start With

- Identify an evaluation problem
- Hypothesize results
- Propose an experimental plan
- Execute the plan
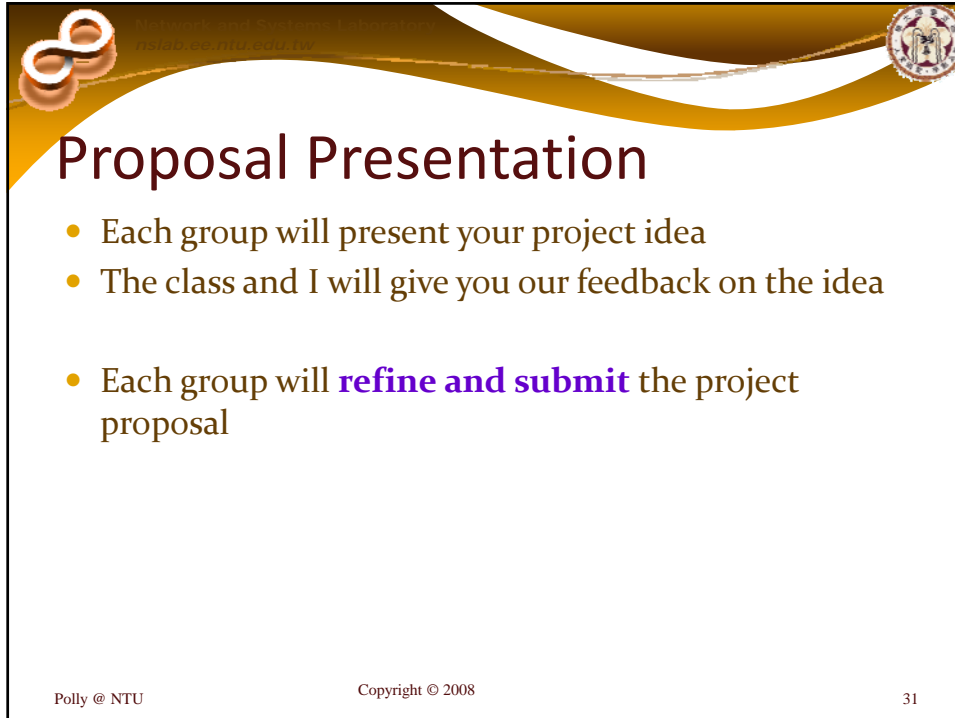- Analyze experimental results
- Present the results

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Formality

- Working in groups of 2 or 3

- Write-up
  - 1-page, 11-pt-font, double-spaced proposal at the mid point of the semester
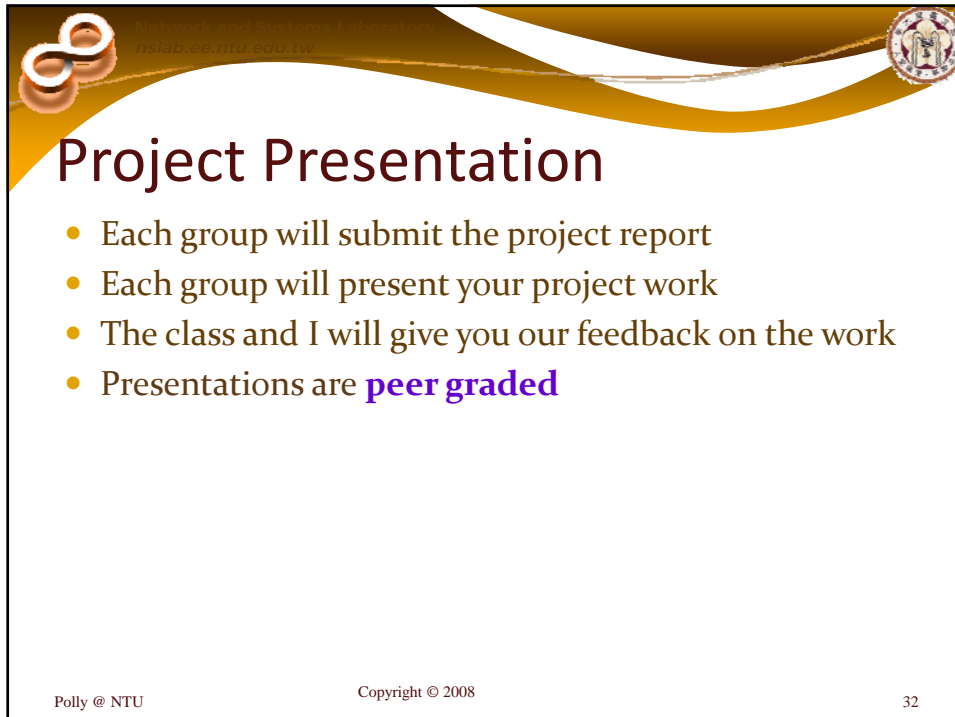 - 6-page (or less), 11-pt-font, double-spaced report by the final week

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Proposal Presentation

- Each group will present your project idea
- The class and I will give you our feedback on the idea

- Each group will **refine and submit** the project proposal

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Project Presentation

- Each group will submit the project report
- Each group will present your project work
- The class and I will give you our feedback on the work
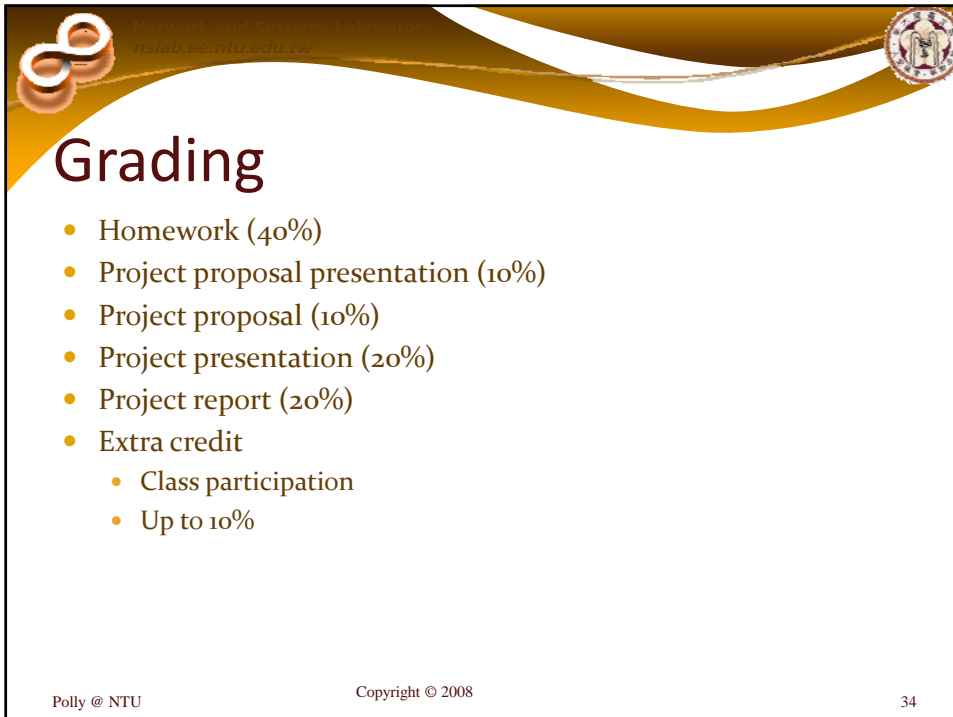- Presentations are **peer graded**

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Grading

- Homework (40%)
- Project proposal presentation (10%)
- Project proposal (10%)
- Project presentation (20%)
- Project report (20%)
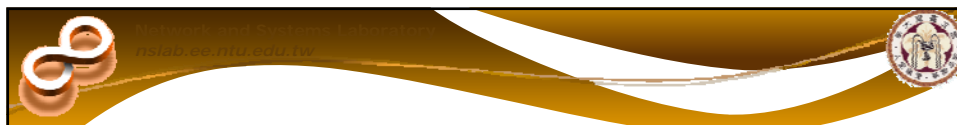- Extra credit
  - Class participation
  - Up to 10%

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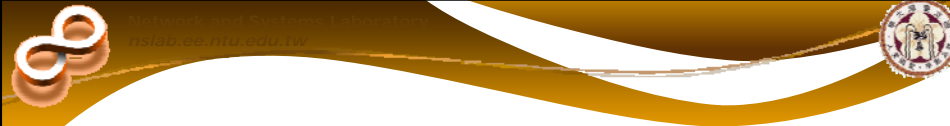 - Term project
- Grading policy
- **Class material**

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Class Material

- Tool manual pages
- Reading List

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Additional Material

- Lecture slides in ppt format

- All available from the course page

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Questions?

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Adds

- There is a threshold for taking this class
  - Form teams
  - Team leaders send emails to me by **next Thursday 1:00 pm**
    - Name and student ID of all members
    - Mark who's the team leader
  - HW#1: Installing FreeBSD
  - Demo to me by **next Friday 12:30 noon**
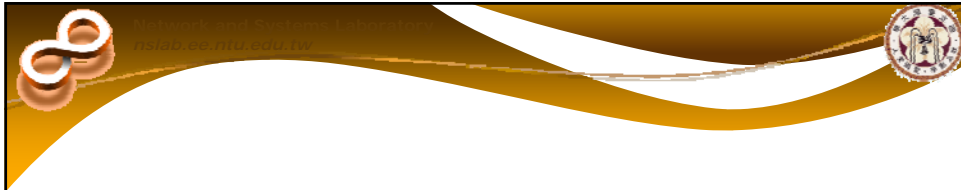   - All team members get the authorization codes after passing HW#1

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Questions?