Syllabus — 編譯程式設計(Spring, 2013)

1. 教師: 徐讚昇(中研院資科所)
   http://www.iis.sinica.edu.tw/~tshsu
   Office hours: by appointments; before or after the classes.

2. 助教:施致誠
   Email:b96120@csie.ntu.edu.tw
   TA office hours:星期三上午10:00 – 12:00 @資訊系館408

3. Web page for this course: http://www.iis.sinica.edu.tw/~tshsu/compiler2013

4. Class materials:

   - Textbook: "*Compilers Principles, Techniques, and Tools*", by Aho, Lam, Sethi, and Ullman, 2007 (2nd edition) Addison Wesley. — The updated "dragon" book.
     Textbook homepage: http://dragonbook.stanford.edu

   - Class notes: Class notes for the year 2007 are available at
     http://www.iis.sinica.edu.tw/~tshsu/compiler2007

5. 上課時間及地點: 每週四2:20PM – 5:10PM @ 資訊系館110

6. Class dates:

Feb			21	28 (no class)	
Mar	7	14	21	28	
Apr	4 (no class)	11	18	25 (mid-term exam)	
May	2	9	16	23	30
Jun	6	13			

7. Prerequisites: assembly language, high-level programming language (C-like language), data structures, and automata.

8. Topics: (Reading ch#1.6 and ch#2 by yourself is expected and required.)

   - Introduction (ch#1.1–1.5)
   - Lexical analysis (Scanner) (ch#3.1–3.4, 3.6, 3.7, 3.5, 3.8): regular expressions, finite state automata, LEX
   - Syntax analysis (Parser) (ch#4.1–4.7): context-free grammar, top-down parsing, LL(1), bottom-up parsing, SLR, LR(0), LR(1), LALR(1)
   - Syntax-directed translation (ch#5.1–5.6, 4.8, 4.9): Syntax-directed translation, using ambiguous grammar, YACC
   - Symbol tables (ch#2.7, 6.5): data structures for symbol tables, type checking
   - Intermediate code generation (ch#6.1–6.4,6.6–6.8): intermediate code, declarations, expressions, advanced data structure, control flow, procedure/function, other statements
   - Run time storage organization (ch#7.1–7.4): stack, access to no-local data, heap
   - Optimization (ch#8.4,8.5,8.6,9.1,9.2,8.7): basic blocks, flow graphs, machine-independent optimizations
   - How to write a compiler
   - Advanced topics[1]: garbage collection (ch#7.5–7.8), parallelism (ch#10, ch#11), ...

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[1]if time allowed.

9. Lecturing schedule (approximately)

No.	Date	Topics	Notes
1	Feb. 21	Introduction; Scanner (I)	
2	Feb. 28	**Holiday**	
3	March 7	Scanner (II) LEX	Announcing HWK#1
4	March 14	Parser: Introduction Top-down parsing (I)	
5	March 21	Top-down parsing (II)	HWK#1 due Announcing HWK#2
6	March 28	Bottom-up parsing (I)	
7	April 4	**Holiday**	
8	April 11	Bottom-up parsing (II)	HWK#2 Due Announcing HWK#3
9	April 18	Bottom-up parsing (III)	
10	April 25	**Mid-term exam**	covering all lectures that are given now HWK#3 due
11	May 2	Syntax-directed translation	
12	May 9	YACC and data structures	Announcing HWK#4
13	May 16	Intermediate-code generation (I)	
14	May 23	Intermediate-code generation (II)	
15	May 30	Run-time environments (I)	HWK#4 due Announcing HWK#5
16	June 6	Run-time environments (II)	
17	June 13	Optimization Putting everything together	HWK#5 due
18	TBA	**Final project due**	

10. Evaluation:

   (a) homework (25%): one homework per 2 to 3 lectures.
   作業遲交每一天扣10%, 抄襲(被抄襲)均不計分，並依校規處理。

   (b) mid-term exam (35%): April 25, 2:20PM–5:10PM.

   (c) final project (40%): code, documents, reports, and test data; 期末專題不得遲交,抄襲(被抄襲)均不計分，並依校規處理。

   (d) class participation and performance.