# APS 105S – Computer Fundamentals

Professor Paul Chow

Fall 1996

## 1 General Information

APS 105S — Computer Fundamentals — is designed to give you an introduction to computer systems and their role in problem solving in science and engineering, and to provide you with the basics for studies in greater depth in subsequent years. The course consists of lectures, laboratories and tutorials. Major topics to be covered in the lectures include: Problem solving; Algorithms; Data Structures; Programming in *Turing* and *C*; Computer Organization; and Operating Systems. The laboratories will provide you with an opportunity to exercise concepts introduced in the lectures through a number of programming assignments using the Turing programming language.

## 2 Home Page

There is (will be) a home page for this course. It can be found by going to

*http://www.ecf.toronto.edu/apsc/courses/*

and clicking on the link to APS105F. The most recent versions of this handout, many others, and the labs, will be accessible here. Watch this page for updates on test dates and locations, and other news for the class.

## 3 Instructor

Professor Paul Chow
LP484A
978-2402
pc@eecg.toronto.edu

## 4 Office Hours

Best to get me after lectures.



## 5 Lectures

| Monday | Wednesday | Friday |
|---|---|---|
| 9–10 | 9–10 | 9–10 |
| GB 120 | GB 120 | SF1101 |

## 6 Labs and Lab Assignments

The schedule below shows the times for the lab sections. While lab access and use are possible any time, you *must* regularly attend your scheduled lab session. Teaching assistants will be available to answer any questions and offer help at those sessions, and will assign you a grade based on your progress in each lab session. If you have the assignment working before the lab session, then you only need to attend long enough to get a grade assigned.

| Thursday | Friday |
|---|---|
| P0101 | P0102 |
| 4-6 | 4-6 |
| SF1012 | SF1012 |

The lab assignments consist of programming assignments using the Turing and C programming languages. A handout describing each assignment will be distributed in class the week prior to the beginning of the assignment. The lab assignments will take a substantial amount of your time. **It is important to start as early as possible on your assignments and to avoid procrastination.**

Although the assignments do not contribute significantly to your final grade, you must work and finish each assignment. The lab quizzes, which contribute substantially your grade, will be based largely on these assignments. It is unlikely you will be able to score well on these quizzes if you do not work independently on and finish the assignments.

The Lab schedule will be as follows this term:

| | | | | | | |
|---|---|---|---|---|---|---|
| **Assignment:** | 0 | 1 | 2 | 3 | Quiz 1 | 4 |
| **P0101 Due:** | Sept 12 | Sept 19 | Sept 26 | Oct 3 | Oct 10 | Oct 17 |
| **P0102 Due:** | Sept 13 | Sept 20 | Sept 27 | Oct 4 | Oct 11 | Oct 18 |
| **Assignment:** | 5A | 5B | 6 | 7 | Quiz 2 | 8 |
| **P0101 Due:** | Oct 24 | Oct 31 | Nov 7 | Nov 14 | Nov 21 | Nov 28 |
| **P0101 Due:** | Oct 25 | Nov 1 | Nov 8 | Nov 15 | Nov 22 | Nov 29 |

## 7 Tutorials

Tutorials are scheduled for Thursday from 10–11am in room SF1013. However, they will be held **only when necessary**, as announced in class. No new material will be presented in the tutorial sessions. They are used to deal with difficulties experienced in in understanding key concepts or programming.

# 8 Textbooks and Notes

For those students **who already have programming experience**, there is no required textbook. However there is supplemental reading material as described below.

Those **students with little or no programming experience** require the text:

> Elliot B. Koffman, Richard C. Holt, and Chrysanne Dimarco, *Turing - Problem Solving and Program Design*, Addison-Wesley, Don Mills, 1994. ISBN-201-42640-4

**All students** will need a *Turing* language reference book. The book by Koffman, Holt and Dimarco is quite suitable for this purpose, but a cheaper alternative for **experienced programmers** is:

> R.C. Holt, *Turing Reference Manual*, fifth edition, HSA, Toronto, 1994. (This book is available with or without software. You do not need to buy the software unless you wish to run Turing on your own personal computer.)

The above books are available at the University Bookstores. There will also be an *OOT Software Sale*. See the form at the end of this handout.

**All students** will need a UNIX guide to be able to use the Engineering Computing Facility computers in the laboratory.

> J.D. Gorrie, *Getting Started with UNIX*

This is available from the ECE Photocopy Room, SFB540, at a reproduction cost of about $3.

In addition to the above books, every student in the course is expected to understand a number of basic concepts in computer hardware, computer software and computer science, which will be covered in the lectures, but will not necessarily be found in the recommended books above. This material can be found in some book chapters that will supplement the concepts presented in the lectures [1]. It is your responsibility to find and read this material. You are responsible for it on the midterm and examination.

**Read the following material on Computer Structure,**

1. V. Carl Hamacher, Zvonko G. Vranesic and Safwat G. Zaky, *Computer Organization*, McGraw Hill, Toronto, 1996. Fourth edition: Chapter 1.

**and the following material on Data Structures**

2. J. Glenn Brookshear, *Computer Science - An Overview*, Benjamin Cummings, Redwood City, Calif. Third or fourth edition: Chapter 7.

**and either of the following readings on Algorithms**

[1] If you are flush with money, and would like a textbook on computer fundamentals that will be of value long after you complete this course, you are advised to buy a copy of Brookshear or Goldschlager. Second-hand copies are sometimes available.



3. J. Glenn Brookshear, *Computer Science - An Overview*, Benjamin Cummings, Redwood City, Calif. Third or fourth edition: Chapter 4.
4. Les Goldschlager and Andrew Lister, *Computer Science: A Modern Introduction*, Prentice-Hall International, London, England, 1988. Second edition: Chapter 2.

**and either of the following readings on Operating Systems.**

5. J. Glenn Brookshear, *Computer Science - An Overview*, Benjamin Cummings, Redwood City, Calif. Third or fourth edition: Chapter 3.
6. Les Goldschlager and Andrew Lister, *Computer Science: A Modern Introduction*, Prentice-Hall International, London, England, 1988. Second edition: Section 5.5.

This table indicates what material corresponds to which topics covered in class:

| Topic | References | | |
|---|---|---|---|
| | Koff[1] | Gold[2] | Brook[2] |
| Introduction; Program execution; Introduction to Algorithms; **Turing**: creating, compiling and running a program. | 1.6, 1.7 | Ch 1 | Ch 0 |
| Definition and representation of algorithms **Turing** as pseudo-code language; Sequencing; Data and assignment statements; Types; Simple I/O; Selection; **if**; syntactic and semantic errors | 2.1–2.5, 4.1–4.4, 4.8 | 2.1–2.5 | 4.1–4.3 |
| Repetition; While and Repeat loops; **Turing** loops; Examples of algorithms; Counting loops; **for** | 5.1–5.7 | 2.6–2.7 | 4.4 |
| Modules; functions and procedures; Scope; Information hiding; Parameter passing | 7.1–7.7 | 2.8 | 4.3 |
| Stepwise refinement; Computer Graphics; Turing graphics | 7.5, 7.8, 6.1–6.7 | 2.1–2.5 | 4.1–4.3 |
| Recursion; Arrays; Subrange types; Named types | 11.1-11.6, 11.9 , 14.1–14.6 | 2.9, 2.11 | 4.5, 7.1, 7.2 |
| Records; Pointers; Pointers in **Turing**; Dynamic data structures | 12.1–12.4[3] | 2.11 | 7.2, 7.3, 7.5 |
| System Software | | 5.5 | 3.1–3.4 |

[1] Experienced programmers may substitute the appropriate sections of the *Turing Reference Manual* for the Koffman sections listed.
[2] Either Goldschlager or Brookshear will usually suffice. It is not necessary to read both references, although there is no harm in doing so.
[3] Koffman does not describe the **Turing** implementation of pointers. The lectures will attempt to do this in some detail.

# 9 Grading

There will be one mid-term test, two lab quizzes and a final exam. The test will focus mainly on the material covered by the lectures, while the quizzes will focus on the programming language and the programming assignments. The final exam will be comprehensive, covering all material. The schedule for the test and quizzes is as follows:

| What? | When? | Where? |
|---|---|---|
| Midterm Test | Tuesday, Oct 29<br>6:00 – 8:00pm | TBA |
| Lab Quiz 1 | Oct 10/11<br>4:00 – 6:00pm | SF1012, TBA |
| Lab Quiz 2 | Nov 21/22<br>4:00 – 6:00pm | SF1012, TBA |

The composition of the final grade is as follows:

| | |
|---|---|
| Lab Assignments | 10% |
| Lab Quizzes | 30% |
| Test | 15% |
| Final Exam | 45% |

The exam and midterm are **No Calculators** and **No Aids (Type A)**.

# 10 Getting Help

If you would like clarifications or explanations of laboratory materials, the first sources of help are the Teaching Assistants (TAs) in the laboratory. Sending email to one of the TAs should also elicit some response. Otherwise, feel free to get in touch with the instructor.

# 11 Exercises

Practice is the only way to learn programming. If you do only the assigned laboratory exercises of this course, you will not develop your programming skills adequately to earn



a decent mark in this course nor to sustain you in the requirements of the second year computing courses. There are many programming exercises in Koffman. If you have that text, you should do enough of them to make yourself confident in programming. A set of programming exercises will be available from the ECE Photocopy room (SFB540) for a modest fee. Ask for APS105 Exercises. Try some of them. Some solutions can be found on the ECF computers in /usr/copy/aps105. You are advised to try to solve a problem yourself **before** looking at its solution.

If you wish to make a purchase at the OOT sale, bring this form with you.

OOT SOFTWARE FOR COMPUTER SCIENCE COURSES

Many students are using the Turing Software on their own computers and too often have used illegal copies. In future, whenever a student submits a piece of work for marking that has been done on a personal computer (other than a university machine), it should include the registration number that has been given to the student when a legal copy of software is purchased or registered with HSA Inc.

This package will be for personal/individual use only (one per student). Resale is not permitted.

The date and locations are as follows:
Downtown:  Monday Sept. 23, 1996 203 College St. Suite 305  2:00pm - 7:00pm
Scarborough: Thursday Sept. 12th, 1996    Java Junction  1:00pm - 6:00pm

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Student Name:                          ECE Course: APS 105F

Instructor's Name: Paul Chow

Registration Number :

| | |
|---|---|
| (1) WinOOT software | $35.00 |
| (2) DOS OOT software | $35.00 |
| (3) MacOOT software | $35.00 |
| (4) WinOOT software & User's Manual | $45.00 |
| (5) DOS OOT software & User's Manual | $45.00 |
| (6) MacOOT software & User's Manual | $45.00 |
| (7) OOT User's Manual Only | $10.00 |
| (8) Object Oriented Turing Package (WinOOT, DOS OOT, User's Manual, Reference Manual) | $90.00 |

Upgrades:

| | |
|---|---|
| (1) upgrade from Turing to OOT (software only) | $25.00 |
| (2) upgrade from Turing to OOT (full package) | $65.00 |

Students requesting upgrades must bring their disks.