Bull-GE DTSS

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Simulator available for Mac and Windows.

June 2007 Reunion Photos here and here.

A small group of "friends of DTSS" have started a project to recreate the first DTSS (Phase I), which ran from 1964 to sometime in 1967. This system ran on two computers, a GE-235 (and GE-6000) to execute programs (such as ones written in BASIC) and a GE DN-30 (Datanet-30) to handle communications (to and from teletypes) and to schedule the execution of programs on the 235. This ingenious two-computer design was created by Tom Kurtz and John Kemeny.

At the DCTS (Phase II) de-commisioning ceremony several of us got together and decided to attempt to recreate the original system. Our plan is to create emulators for each of the two computers, and use them to run the original software. The emulators will need a decent graphical interface so there is a fair amount of ancillary code that needs to be written.

The biggest problem we faced during the first year was to find listings of the original software. Some of us had a listing or two, and a few of us had the original computer manuals, but no one had a listing of BASIC. After about a year of searching, Steve Hobbs determined that George Friend, an ex-GE employee, had a box of old listings in his garage, one of which was Basic.

Steve took the listings for the key software components and the manuals, and scanned them on a CD in several formats, including pdf. These scans are available from this web site. (He considered using OCR software, but it didn't work well enough to be practical. How do you tell a fuzzy capital "Oh" from a "Zero"? The result would have had to have been proofread carefully, letter by letter.) The alternative was to transcribe the source code, letter by letter, digit by digit. This has now been done for the four principal software components.

Basic
Algol
235 Executive
DN-30 Executive

(Tom Kurtz transcribed BASIC and Algol, John McGeachie did the 235 Exec, and Ron Martin the DN-30 Exec.)

The next step was to "assemble" the source code. Tom Kurtz wrote an Assembler (in True BASIC) and Ron Martin did the same for the DN-30 (in Excel.) The assemblers then produced a replica of the original listing, the octal output of which could then be carefully proofread against the octal part of the original listing.

Tom Kurtz then wrote an emulator for the GE-235 hardware, again using True BASIC. This he used to test both the BASIC and Algol systems. He faked the functionality of the DN-30. His simulation accepts only one user at a time.

April 12, 2007: Updated versions of Tom's TrueBASIC DTSS simulation
Downloads: [Windows] | [Macintosh] (Classic only)

The simulation includes Algol as well as BASIC. There is a short manual for BASIC in pdf form. An Algol manual is on the way. (Anyone who has programmed in Pascal will see similarities.)

To slow things down to Model 33 Teletype speed, use the command

SPEED 10

(He tried to place characters on the screen, at a rate of 10 per second, but it was just too ugly, at this stage, at least.)

The current status of the project
Want to join our mailing list? Email marion dot bates at dartmouth dot edu and tell me that you would like to be added to the DTSS-Project mailing list.
Source images
Transcribed listings
Proofed listings

The Current Status of the Project
Simulator available for Mac and Windows.

We have listings for the D-30 exec, the 235 exec, the Algol compiler, Algol run-time, and BASIC compiler/run-time/teach. These listing have been scanned and the images are available on the web page (is this true?). Ron Martin has transcribed the D-30 exec listing into a text file of source card images; John McGeachie has transcribed the 235 exec listing into a text file of source card images; and Tom Kurtz has transcribed the Algol compiler, Algol run-time and BASIC listings into text files. Tom Kurtz has written a GE-235 simulator good enough to test BASIC and Algol. Ron Martin has volunteered to write a D-30 simulator and John McGeachie has volunteered to write a more complete GE-235 simulator.

Our BASIC listing represents a version of BASIC maintained by GE. It bears a date of February 1965. However, the assembly listing itself is not dated, so it is impossible to tell when it went into service. It includes the following: the INPUT statement; the additions by Keith Bellairs to locate named-variable storage at the top of lower memory; most of the coding for TEACH, although it contains several coding anomalies that would have prevented TEACH from running. It is missing later features such as the MAT statements. And, it could not have run John Kemeny's FTBALL*** program, which was written in the late fall of 1965. We have a few more listings that have not yet been scanned nor transcribed, including time-sharing LISP and a batch version of WIZ. However, we are still looking for additional listings. We particularly would like to find: (1) the EDIT system, (2) contents of the LIBBAS, LIBALG, and TEACH libraries, (3) the TSAP system, and (4) background BASIC.

It would also be interesting to find listings of some of the other software that is part of the system: Dartmouth GAP and D-30 GAP, SYMMAINT, time-sharing Fortran, time-sharing LAFFF (notes below), time-sharing DIP (who can remember what DIP was), the utility program that loaded the D-30 exec onto the disk, the D-30 boot paper tape.

NOTE: Dave Pearson has an answer to the query about LAFF: "I don't remember who coded it, but I remember that it was LAFFF, not LAFF -- Language to Aid Financial Fact Finders."

ADD'L NOTE: Nancy Broadhead also writes: "LAFFF was written by Dot Bower, who was not a Tuck student but was Tuck's research support person. Her husband, Tuck prof Dick Bower, was presumably the inspiration for the project. Some years later, CRIII was added to the portfolio. I don't remember how that acronym translates."

About DTSS:

(The following is excerpted from the EXPLAIN HISTORY command on DCTS.)

In September, 1963, under the direction of mathematics professors John G. Kemeny and Thomas E. Kurtz, a project to establish a time-sharing system at Dartmouth got under way. The fruits of this project were BASIC, a simplified programming language, and a time-sharing system -- using the GE-235 and Datanet-30 computers. This system began operations in May, 1964. In 1965, Dartmouth placed off-campus terminals in secondary schools in the area. At the same time, other computer installations began to use Dartmouth's system software.
Dartmouth/GE Paper: "The Dartmouth Time-Sharing System" (1964)

The Kiewit Computing Center and the Dartmouth Time-Sharing System: brochure describing Kiewit and DTSS.

The Evolving Time-Sharing System at Dartmouth College: article from Computers and Automation, Sep. 1965.

Dartmouth Time-Sharing: article from Science, October 1968.

Multics Chronology. Timeline and mini-history spanning 1959-2000.

Dartmouth College Time-Sharing Marks a Quarter of a Century: news release from Dartmouth News, April 27th, 1989.

Nancy Broadhead provided a tape from 1974, "Reminiscences of DTSS" from Pioneer Day. Several original users/creators describe the system and tell stories. Total length is about one hour. [Part 1] | [Part 2]
These audio files are in MP3 format. Part 1 is about 33 MB, and part 2 is about 12 MB. If you have an MP3 player with streaming capability (Apple's iTunes program is one), then you can "Open Stream" and paste in http://www.dtss.org/remin1974-1.mp3 (or part 2) and it will play over the Internet instead of downloading to your local machine.
Steven Hobbs has provided a transcript of this session: [PDF] (approx. 1.7 MB) | [HTML]

People:
"Everyone a Programmer": A mini-biography of John Kemeny, by Jay Robert Hauben.

Kemeny Birthday Tribute by Akos Herman. Also available in Hungarian.
Local copies in case of broken links: [English] | [Hungarian]

(The Reminiscences audio/transcript above also provides some biographical information about many of the key members of the original DTSS team.)

Miscellaneous:
"Ode to a Computer -- "G.E. 235 We Sing Thy Praises", from The Dartmouth newspaper's Kiewit Supplement, December 2, 1966.

Joe Hill found this artifact with Google: "Dartmouth Kiewit System" by The Lone Ranger
This is a 1986 BBS textphile describing the Kiewit network and DTSS from a hacker's standpoint. Contains some foul language.

These are my (Marion) session logs from the first time I ever logged on to DCTS (the later version of DTSS). I had no clue what I was doing. :)

1887
Harry Bates Th'79 designs an electrical punch-card machine for the 1890 United States Census. He goes on to found the Tabulating Machine Company, which evolves into I.B.M.

1940
Bell Laboratories mathematician George Stibitz conducts the first public demonstration of remote computing. He connects a terminal at Dartmouth to his headquarters' "automatic calculator" in New York.

1956
The term "artificial intelligence" is coined by Dartmouth mathematician John McCarthy.

1959
Dartmouth gets its first real computer: the LGP-30.

1964
The Dartmouth Time-Sharing System (DTSS) is born at 4:00 a.m. on May 1 when it solves the problem submitted by two terminals simultaneously: "Print 2+2." The system fails an average of every five minutes.

1968
Results of a swimming competition are computerized for the first time. A student keyboards data at poolside using a teletype and a modem. Applause for an especially good dive disrupts the terminal's acoustic link, crashing the program and eliminating all of the accumulated scores.

1972
First computer scientist hired
Larry Harris. Ph.D. in Computer Science from Cornell

1975
A survey reports that 73 percent of the student body is enrolled in a course that uses computing. There are 184 such offerings.

1977
Thirteen thousand volts pass through the body of a small squirrel. Kiewit is shut down for ten hours.

1978
Second computer scientist hired
Scot Drysdale. Ph.D. in Computer Science from Stanford.

Computer Science major established
(during John Kemeny's presidency). First degree was awarded in 1979.

1981
The Dartmouth College libraries develop an experimental on-line catalog.

1984
Macintosh introduced campus-wide
This was a 128k machine.

Department name changed to Department of Mathematics and Computer Science

First senior hire
Professor Donald Jonson (Ph.D. Cornell. 1973). His startup funds were used to purchase for CS faculty the first Sun workstations at Dartmouth.

1985
Ph.D. Program in Computer Science established
There were five Computer Science faculty at this time.

1986
Xerox awards a University Grant to Dartmouth
The grant consisted of $1,000,000 of workstation equipment and provided the impetus to connect the Thayer School by a fiber optic link to the rest of campus.

Six hundred years' worth of scholarship on Dante's Divine Comedy are offered through an on-line database. Other new networked databases include alcohol-related writings, and a compilation of all 1,623 concerts given by the Grateful Dead.

1990
KeyServer, a Dartmouth innovation, allows controlled access to commercially available programs for the Macintosh. Students and faculty get to use the programs for free.

1991
First Ph.D. degree in Computer Science awarded
There were 10.5 regular plus 5 associated faculty.

Second senior hire
Associate Professor Fillia Makedon (Ph.D. Northwestern. 1982).

1992
Dartmouth Institute for Advanced Graduate Studies established
First summer symposium held: 100 attendees.

1993

First massively parallel computer acquired at Dartmouth
The 2048-processor DECmpp was obtained with funding from Digital Equipment Corporation, the National Science Foundation, and the Kiewit Computation Center.

Sudikoff Laboratory for Computer Science finished.

The College announces that it will pull the plug on the Dartmouth Time Sharing System.

1994
Independent Department of Computer Science formed

Dartmouth puts a home page on the Internet's World Wide Web.

1999
11:59pm, December 31: DCTS is shut down for the last time.

2000
12:01am, January 1: Original founders decide to re-write DTSS as an emulator.
This project is born.

2004
May 11: TrueBasic-based emulator available for Mac and Windows here.

Portions reprinted without permission from the Dartmouth Alumni Magazine, March 1995.

The time now is Fri Aug 17, 2007 10:28 pm
Dartmouth Computing 1960-1970 Forum Index
View unanswered posts

Forum Topics Posts Last Post

Testing 1-2-3

Test Forum
Use it to see how phpBB works

3
4
Wed Jun 04, 2003 4:27 pm
RHargraves

General Information

About This Board
Purposes, management, and user instructions

3
3
Mon Jun 02, 2003 7:49 pm
DC-Admin

Life before Dartmouth

Sputnik & Math & Science
How math and science education got the money

3
8
Wed Apr 21, 2004 5:00 pm
Sputnik era

Computer Experience
Digits before Dartmouth

1
3
Tue Apr 20, 2004 4:29 pm
Tom Martin

The Dartmouth Scene

Why Dartmouth?
Of all the gin joints . . .

3
4
Wed Apr 21, 2004 5:09 pm
Tom Martin

What it Was Really Like

6
7
Sun May 02, 2004 4:40 pm
Tom Martin

The LGP-30 Days

First Experiments - 1959
What were some of the things Dartmouth students did on the LGP-30 in the summer of 1959.

1
1
Thu Jul 10, 2003 4:13 pm
Tom Kurtz

Algol-30
Four Dartmouth students developed a subset of Algol-60, which we called "Algol-30".

1
1
Thu Jul 10, 2003 3:37 pm
Tom Kurtz

Other Applications
Many students did interesting things on the LGP-30.

1
2
Tue Apr 20, 2004 3:36 pm
Tom Martin

SCALP
This Self-Contained Algol Processor led naturally to time-sharing and BASIC.

2
3
Thu Aug 14, 2003 1:17 pm
Bill Marsh

The Decision to do Time-Sharing

The Decision
John McCarthy (MIT) got the ball rolling around 1961 when he urged: "You guys ought to do time-sharing."

1
1
Thu Jul 10, 2003 4:06 pm
Tom Kurtz

Choosing a Vendor
How Dartmouth chose GE is an interesting story.

1
1
Thu Jul 10, 2003 4:24 pm
Tom Kurtz

Initial Design
Tony Knapp created MESS, the original design paper.

1
1
Thu Jul 10, 2003 4:28 pm
Tom Kurtz

Creating the TSS Software

The Design
The two-machine model seemed natural for Dartmouth; it turned out to be brilliant.

1
1
Mon Jul 14, 2003 10:27 am
Tom Kurtz

The Hardware Arrives
The real work began when the hardware arrived in February, 1964.

1
1
Mon Jul 14, 2003 10:33 am
Tom Kurtz

Off And Running

BASIC was "born" at 4AM on May 1, 1964. The rest is history.

3
3
Thu May 04, 2006 12:22 pm
Robert Schuldenfrei

All times are GMT - 4 Hours

Who is Online

Our users have posted a total of 44 articles
We have 4733 registered users
The newest registered user is axBoyporbzoob

In total there is 1 user online :: 0 Registered, 0 Hidden and 1 Guest [Administrator] [Moderator]
Most users ever online was 73 on Thu Jul 19, 2007 3:45 am
Registered Users: None

This data is based on users active over the past five minutes

Log in

Username: Password: Log me on automatically each visit

New posts

No new posts

Forum is locked

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