

## Outline

- Announcements
  - Add/drop by Monday
  - HWI coming on Friday
- Loading BLAS
- Loading LAPACK

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## BLAS

- BLAS is available as
  - raw code
  - commercial packages (IMSL, Intel “Math Kernel Library”)
  - ATLAS-- “Automatically-Tuned Linear Algebra Subroutines”

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## ATLAS

- Code to build an optimized version of BLAS
  - (hopefully faster than just compiling BLAS)
- Available as code or pre-builts from Netlib
- atlas3.2.0\_Linux\_PIIISSE1256.tgz
  - “Pentium III with 256K L2 cache, using SSE1 for single precision”

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## LAPACK

- LAPACK is also available as
  - raw code
  - commercial packages

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## LAPACK

- Download lapack.tgz from Netlib
- edit make.inc for this platform
  - compiler =g77, options=-g -O2
  - BLASLIB = -  
L\$(HOME)/cs404/ATLASLinux\_PIIISSE1256  
-lf77blas -latlas
- edit Makefile
  - comment out blaslib dependency

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## LAPACK

- make
  - compiles LAPACK code
  - creates libraries
- Followed install instructions to merge LAPACK with the LAPACK routines from ATLAS

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## UNIX Libraries

- Pre-built libraries (commercial or otherwise) are stored as "archives" on UNIX machines
  - lib<NAME>.a
  - System libraries are in directories like /lib and /usr/lib
  - archives are actually collections of object code (.o)

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## Review of Building

- Build process:
  - compile--creates machine instructions (object code)
    - g77 -c foo.c ----> foo.o
  - link--merges object code to create executable
    - g77 foo.o bar.o -ofobar----> combines instructions in foo.o and bar.o as well as system libraries to create foobar

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## Building with libraries

- 1) Compile the code you have (use -c)
- 2) Link your code together and link to the libraries you need
  - g77 <YOUR OBJECTS> -L<LIBPATH> -lname
  - -L sets directory where linker will look for libraries
  - -lname links to libname.a in LIBPATH or system libraries

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