Cross Compiling, Make, & Editors



ENSC 351

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Slides #4

What software components run on the board?
 How can we build our software?
 How can we edit files via just text console?

Software Components



Boot Select



Servers & Directories

- Work (private) Directory

 Store all development files
 Ex: .c, makefiles
- Public Directory
 - Holds files to... share with board.
 - Unprotected by passwords!
 Only for compiled code.



Cross-compile demo

 Compile on host for target (host)\$ arm-linux-gnueabihf-gcc hello.c -o hello

 Check compiled file (host)\$ readelf -h hello

 Run on board via NFS (one line each) (bbg)\$ sudo mount -t nfs 192.168.7.1:/home/morteza/cmpt433/public /mnt/remote
 (bbg)\$ cd /mnt/remote/

(bbg)\$./hello

Makefiles

Makefile Basics

- Makefiles are.. scripts used for compiling projects.
 - Name your script Makefile
 - Build a specific make-target with:.. (host)\$ make daTarget
 - Build default make-target with: (host)\$ make

Examples

(host)\$ make clean (host)\$ make all

Simple Makefile



More Makefile



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Compiler Flags

OUTFILE = factorial OUTDIR = \$(HOME)/cmpt433/public/myApps

CROSS_COMPILE = arm-linux-gnueabihf-CC_C = \$(CROSS_COMPILE)gcc CFLAGS = -Wall -g -std=c99 -D _POSIX_C_SOURCE=200809L -Werror



..... rest of makefile omitted...

Nano

- Nano is a somewhat easier to use text editor.
 \$ nano myfileToEdit.txt
 - Just type and edit text as you might expect.
- Commands
 - Ctrl+g : Displays help. Ctrl+x to quit help.
 - Ctrl+x : Quit, asks you if you want to save.

Simple create/view a file

Redirect text to a file \$ echo "Overwrite file with text" > test.txt \$ echo "Adding this to end of file" >> test.txt • View a file \$ cat _____daFile concatenate the file, outputs to stdout (terminal) \$ less daLongFile shows page-by-page view of long file \$ tail -20 daLongFile Shows last 20 lines of the file. Pipe output from one tool to another • \$ dmesg displays kernel messages - \$ dmesg | less \$ dmesg | tail -20

- Boot sequence
 - UBoot --> Kernel --> Root File System
- Makefiles automate building software.
 - Create targets for different products/actions.
 - Use suffix rules for large projects.
- Text-based Editors
 - Nano