

Introduction: Unix and C

Software Project –
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Teaching Assistant

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אבטחה Unix & shell -& נאמר לי (*)
 נאמר לי אולי אפשר זה putty נאמר
 nova.cs.tau.ac.il
 www.cs.tau.ac.il/fag-נאמר לי putty נאמר

Basic commands in Unix shells

Command	Short explanation
ls -l	prints the content of a directory
pwd	prints the name of the current directory
cd	change directory
mkdir	creates a new directory
cp	copies a file
mv	moves a file/directory
rm	removes (deletes) a file
rmdir	removes an empty directory
man	help (manual) on a command

אבטחה סגור
 -v אבטחה

groups user-name ר"ב זה אבטחה ר"ב אבטחה

Additional Unix commands

- o cat – concatenate files and print to standard output
 - * cat file1
 - * cat file1 file2 file3
- o less – file viewer ("less" is better than "more")
- o which – locate a command
- o groups – prints the groups the user in (permission...)
- o grep – prints lines matching to a pattern
 - * grep -i "*.lib.*" foo.bar
- o find – search for a file in a directory
 - * find . -name "*.txt" -print
 - * find ~/ -name "*.o" -exec rm {} \;
- o clear – clears the terminal screen
- o finger – prints information about a user
- o who – shows who is logged in
- o whoami – identifies the current user

שם הקובץ (dir) , לרוב הקובץ הנכונות
 שם הקובץ הנכונות ל הקובץ

File and directory permissions in Unix

```
Tera Term - nova.cs.lau.ac.il VT
File Edit Setup Control Window Help
nova5% ls -l a.out
-rwxr-xr-x 1 ozery math 7279 Aug 16 09:05 a.out*
nova6%
```

- permissions = bits 2-10 (bit 1: "d"=directory, "-" = file)
 - * bit 1 = whether is a directory (d) or not (-)
 - * bits 2-4: owner permissions
 - * bits 5-7: group permissions
 - * bits 8-10: other permissions
- rwx:
 - * r – read permission
 - * w – write permission
 - * x – execute (file)/ enter (cd directory)
- changing permissions: chmod
 - * chmod go+rx a.out
 - * chmod -R 755 mydir

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group, others
 הרשאות
 rwx - 7
 rwx - 5
 rwx - 5

Compiling and linking

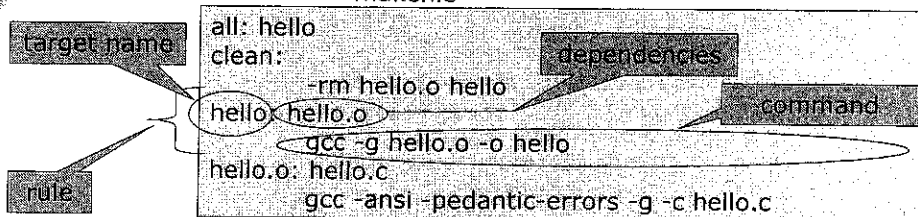
- Compiling and linking
 - * gcc hello.c -o hello
- Only compiling (creating hello.o)
 - * gcc -c hello.c
- Only linking
 - * gcc hello.o -o hello
- Additional common flags to gcc:
 - * -ansi -pedantic-errors - verifies that the code is ANSI C compliant
 - * -g – allows debugging
 - * -l<library-name> – linking with external libraries
 - -lm - if a math function is called (e.g. pow(x))

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פקודת echo בלשון של שם הקובץ
 שם הקובץ הנכונות ל הקובץ
 שם הקובץ הנכונות ל הקובץ
 שם הקובץ הנכונות ל הקובץ
 שם הקובץ הנכונות ל הקובץ

Make and makefiles (in short)

- o makefile: a file containing a collection of rules. Used for building applications
 - * The default name of a filename: "makefile"



- o make: a utility for "executing" makefiles
 - * Makefiles will be covered later in the course. Till then, makefiles will be supplied

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How to use makefiles

1. Copy the makefile into the appropriate directory (e.g. the directory containing the source files)
2. In a shell window (e.g. putty) change to the directory containing the makefile
3. Use the commands: "make clean"+ "make all" to build the executable

The screenshot shows a terminal window titled "Tera Term · nova.cs.tau.ac.il VT" with the following output:

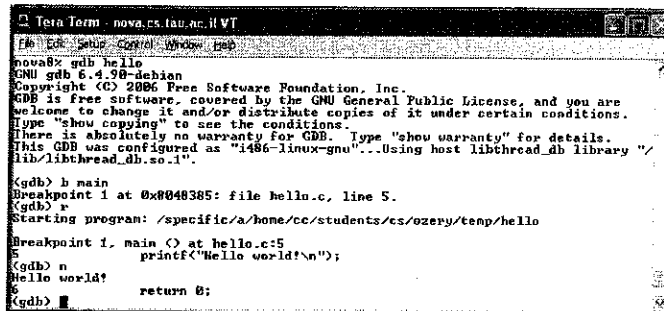
```
File Edit Setup Control Window Help
nova10% ls -l
total 8
-rw-r--r-- 1 ozery math 76 May 29 08:37 hello.c
-rw-r--r-- 1 ozery math 141 May 29 08:43 makefile
nova11% make clean
rm hello.o hello
rm: cannot remove 'hello.o': No such file or directory
rm: cannot remove 'hello': No such file or directory
make: [clean] Error 1 (ignored)
nova12% make all
gcc -ansi -pedantic-errors -g -c hello.c
gcc -g hello.o -o hello
nova13%
```

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winNCP a terminal window 23p 23p 23p

gdb – the GNU debugger

- Running gdb: `gdb <exe>`
- Useful commands: `help`, `quit`, `n`, `s`,
`b <function>/<#line>`



```
nova@x:~$ gdb hello
GNU gdb 6.4-90-debian
Copyright (C) 2006 Free Software Foundation, Inc.
GDB is free software, covered by the GNU General Public License, and you are
welcome to change it and/or distribute copies of it under certain conditions.
Type "show copying" to see the conditions.
There is absolutely no warranty for GDB.  Type "show warranty" for details.
This GDB was configured as "i486-linux-gnu"...Using host libthread_db library "/
lib/libthread_db.so.1".

(gdb) b main
Breakpoint 1 at 0x8048385: file hello.c, line 5.
(gdb) r
Starting program: /specific/a/home/cc/students/cs/ozery/teap/hello
Breakpoint 1, main () at hello.c:5
5      printf("Hello world!\n");
(gdb) n
Hello world!
5
(gdb)
```

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Submission in pairs

- The exercises and project are submitted in pairs
 - ✦ If you do not have a partner – send me an e-mail (no single submissions)
 - ✦ The exercise must be submitted in the home directories of **both** partners.
 - ✦ The submitted directories of the two partners should be identical!

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How to submit

- Under ~/soft-proj09/
 - * Strictly follow the provided file framework for each assignments / project
 - * Perform rebuild: make clean + make all
 - * Verify correct run: use given input/outfile + diff. Output should be exactly as specified! (do not add unnecessary friendly "printf" commands!)
 - * Before submission – give permission

```
chmod 755 ~
chmod -R 755 ~/soft-proj09
```
- Manual submission - one for each pair
 - * printouts of code
 - * Should include: name, user-name, and id-number – of both partners!
 - * submitted to the checker's mail-box (details will be given later)

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