

Prince of Songkla University

Faculty of Engineering

Midterm Examination Semester 1

Academic Year 2006

Date: 4th August 2006

Time: 0900-1200

240-620 Advanced Unix Network Programming

Room: A201

Instructions:

- Books, dictionaries, calculators are allowed
- Make sure there are 34 questions in this exam paper. Attempt all questions.
- Answers can be written in Thai or English

Editors (6 marks)

1. Give list of editors name (at least 4) that available on Linux, what is your favorite one?

Explain how can you perform these functions with your favorite editor (from previous question).

2. Delete the first 15 lines from beginning of file.
3. Move block of code line 10-20 to the end of file
4. Search and replace a single word from line 200-250
5. Copy a block of code to another file

Compiler (4 marks)

6. What is an option for gcc to compile a C source code to an object code?
7. What is an option for gcc to compile a C source code to a binary program, assume that no other object except system library are needed to build that binary?
8. What is an option for gcc to compile a C source code to a static linked binary?
9. Without giving specific output name for compiling with gcc, what is the binary name that gcc will create?

Debugger (5 marks)

10. What is source-level debugging?
11. What need to be done with gcc to allow source-level debugging using gdb?
12. What is a gdb command that use to print source code for a specific functions?
13. What is a gdb command that use to set breakpoint for at a specific line.
14. How can command line arguments of the program supply to the program when being debugged by gdb?

Creating Library (5 marks)

15. What is the program use to create a static library from objects file?
16. If there are 4 object files `t1.o` `t2.o` `t3.o` `t4.o` to be created as library `libt.a`, what is the command line use to create that library?
17. If a program `main.c` requires functions from `libt.a` in previous question how can it linked to output binary `main`?
18. What is compiler options required to create objects file that will be used to created shared library?
19. What is the command that use for list symbols in library or binary program?

Using Make (10 marks)

20. An application that you are going to develop depend on 3 libraries `libt.a`, `libx.a` and math library (system library). Library `libt.a` will be create from 3 functions `t1()`, `t2()`, `t3()` with stored in separate 3 files `t1.c`, `t2.c`, `t3.c` respectively. There is `t.h` header file that is used by all these functions. Library `libx.a` also will created from 3 functions `x1()`, `x2()`, `x3()`, which also separate to 3 files `x1.c`, `x2.c`, `x3.c`. `x1()` and `x2()` required definitions defined in `x.h` header file. `x3()` doesn't required that. The main function will be stored in `main.c` which include `x.h` and `t.h`. Using this information to **create a makefile** for making this application, Makefile should contains definition for `CC`, `CFLAGS` and other macros (if needed). It should also has `clean` target for removing all objects, binary and library files leaving only source file. The final target binary should be called `myApp`, and don't forget that it also required math library, apart of `libt.a` and `libx.a`.

Using revision control system (5 marks)

21. Give list of at least 4 name of revision control system available on Linux

You want to keep source of application in (Using Make) question above on your local repository in your home directory under subdirectory "svn".

22. What is the command to create local repository?
23. What is the command to initial import your "myApp" application source files to svn repository? If assume your myApp directory is directly in your home directory and you want to store this application under "myApp" folder in svn repository.

Assume that you have checkout myApp from repository back to your development area.

24. What need to be done, if a data file "test.txt" has been added to application and you want to keep it in repository too?
25. When changed have been made to files and you satisfy with them, what command need to be used to commit the change to repository.

Programming Conventions using GNU/Linux (5 marks)

26. What `main()` function prototype to be used if environment (such as `HOME`, `SHELL`) are needed?
27. Passing command line options to program using `getopt_long` function, what is the meaning of ":" in short options.
28. Write long options structure equivalent to this short options "a:b:cde" that can be used to provide to `getopt_long()` function.
29. Which function should be used to create a temporary file, if standard I/O library

(fopen, fread, ..., etc) are used to operate with that file.
30. How can a program set exit code that can be check by shell using "\$?" variable?

Process (6 marks)

Write a short program to execute command "ps aux" using

- 31. system() system call
- 32. execlp() system call
- 33. execvp() system call

Program must be complete (has necessary headers and all variables), functions can be called in main().

Signal (4 marks)

- 34. Write a complete program to intercept signal SIGINT that increase variable count every time it receive SIGINT signal, and intercept signal SIGHUP that will print out count variable every time it receive SIGHUP signal. You can use signal() function for handle these signals.