Systems Software/Programming – Lab Manual

Lab 4 – Compiling and Linking multiple c files, Libraries and Make utility

Write C program for each of the problem below. After executing each of the C program, you will need to capture the output in text file format.
C program file will be named as StudentID_Lab4_x.c
Text file with output captured will be names as StudentID_Lab4_x.txt

Problem 1: Create executable from multiple source files and using own header file

- Create a separate sources files to implement following functions:
  - Write c program StudentID_Lab4_1_fact.c to implement factorial of a number function with signature "int myfact(int).
  - Write c program StudentID_Lab4_1_pow.c to implement power function with profile "int mypow(int, int)".
- Create StudentID_Lab4_1_myheader.h to declare the function signatures
- Create StudentID_Lab4_1_main.c to call these function from main() to calculate sin(x) as given by formula
- $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \ldots$
- Compile each of the source files using –c option of gcc to build object files
- Build an executable using all the object files
- Run the executable and capture the output

Problem 2: Create static library using c source files from Problem1

- Create a static library with functions object files (i.e. StudentID_Lab4_1_fact.o, StudentID_Lab4_1_pow.o etc)
- Create an executable without using –l option and run it
- Create an executable with –l option and run it
- Run the executable generated using static library and captures the output.

Problem 3: Create shared/dynamic library using c source files from problem 1

- Create a shared library with functions object files (i.e. StudentID_Lab4_1_fact.o, StudentID_Lab4_1_pow.o etc) which are recompiled using "Position Independent Code" option
- Set up search path for library file in LD_LIBRARY_PATH
- Create an executable with and without –l option
- Create your own configuration file in /etc/ld.so.conf.d/ with folder where your library file is to be used with -l option (without -L option)
- Run the executable generated using dynamic library and capture the output.

Problem 4: Create makefile for all the steps from Problem 1, 2 and 3 and run them instead of individual commands.

Submission:
StudentID_Lab4.zip with total 8 files (4 C program files + 4 captured output text files)