Computer Science and Engineering
IIIT Kalyani, West Bengal

Compilers Design Laboratory (CS 511)
(Autumn: 2019 - 2020)
3rd Year CSE: 5th Semester

Assignment - 2   *Marks: 10*
Assignment Out: *26th July, 2019*   Report on or before: *2nd August, 2019*

1. Write a C++ program that will take one or two command line arguments. The first argument is the name of a relocatable file in ELF (compiled from a C program), containing a set of simple functions of type `int xyz(int)`[1]. The second argument if present is the name of one of the functions. The C++ program *opens* and *maps* the relocatable file in its logical address space:
   ```
   void *mmap(void *addr, size_t length, int prot, int flags,
               int fd, off_t offset);
   ```
   (see the man page)
   It also reads an integer n. Finally it does the following:

   - If there is one command line argument i.e. the relocatable file name is specified, but no function name is given, the first function from the beginning of the `.text` section of the relocatable file is called using a function pointer. The parameter n is passed to the call.

   - If there are two command line arguments i.e. the name of the relocatable file (the first argument) and the name of a function present in it (the second argument). The specified function is invoked using n as the argument.

   - In both the cases the C++ program prints the value returned by the called function.

   It will be necessary to navigate through the ELF data structure of the relocatable file to locate the beginning of the `.text` section and/or the specified function. Definitions of ELF data structures are available in `elf.h`. Reading material for ELF is available at
   `http://cse.iitkgp.ac.in/~goutam/compiler/readingMaterial/index.html`

   The file name of your C++ program is `<Roll No>.2.c++`. Send it to us within the due date.

2. We have a supplied a relocatable file `factFib.o` with two functions `int fact(int)` and `int fib(int)` as test data.

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[1]These functions are not calling any other function.