Department of Computer Science
Laboratory 3: Context Switch in Nachos

1 Purpose

The purpose of this laboratory is

- understand how context switch is realized in Nachos by tracing the Nachos test program in both C++ and the machine code levels.

2 Tasks

The `main.cc` program of Nachos in `../threads/` calls function `ThreadTest()` as follows:

```
void
ThreadTest()
{
    DEBUG('t', "Entering SimpleTest");

    Thread *t = new Thread("forked thread");

    t->Fork(SimpleThread, 1);
    SimpleThread(0);
}
```

The `SimpleThread()` function used above is as follows:

```
void
SimpleThread(_int which)
{
    int num;

    for (num = 0; num < 5; num++) {
        printf("*** thread %d looped %d times\n", (int) which, num);
        currentThread->Yield();
    }
}
```

Your tasks of this lab session is to

1. trace the execution of Nachos and observe the executions of
   (a) context switch function `SWITCH()`
   (b) function `ThreadRoot()`

   using `gdb` and
2. answer the following questions:
   (a) What are the addresses of the following functions in your Nachos:

i. `InterruptEnable()`
ii. `SimpleThread()`
iii. `ThreadFinish()`
iv. `ThreadRoot()`

and describe how did you find them.

(b) What are the addresses of the thread objects for

i. the main thread of the Nachos
ii. the forked thread created by the main thread

and describe how did you find them.

(c) When the main thread executes `SWITCH()` function for the first time, to what address the CPU returns when it executes the last instruction `ret` of `SWITCH()`? What location in the program that address is referred to?

(d) When the forked thread executes `SWITCH()` function for the first time, to what address the CPU returns when it executes the last instruction `ret` of `SWITCH()`? What location in the program that address is referred to?