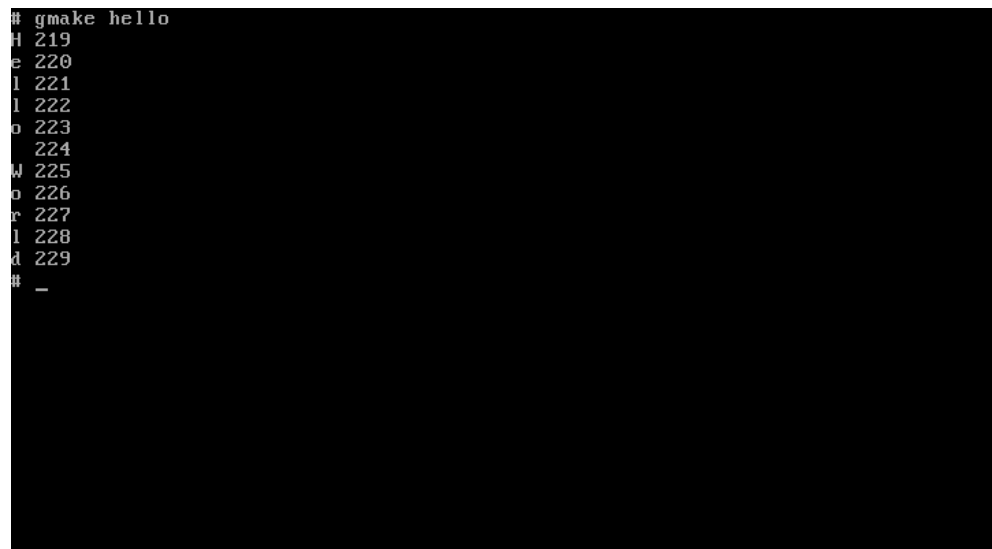# Operating Systems Lab

## Assignment 2

### 180010002

**Part I.** The goal here is to print "Hello World", but each character is to be printed by different process and the process that prints the i th letter must have been spawned by the process that printed the (i-1) th letter.

To achieve this, we need to create nested processes, i.e., parent process creates child process and then child process creates grandchild process for the parent process and so on until each character is printed on the screen. The minimum lines in which I could achieve this is *21* (including the lines to import libraries)*.

**Command: gmake hello**
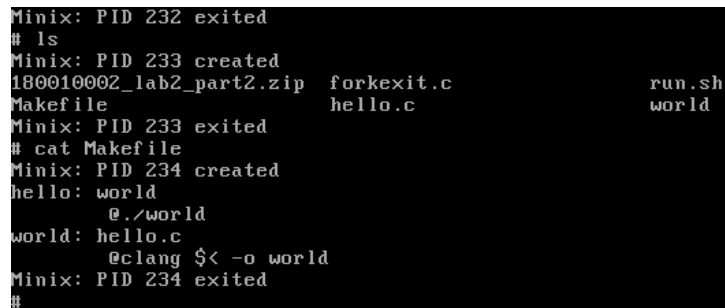
The output is in the figure below:



Figure 1. Part I expected output

**Part II.** The goal here is to modify the minix source code to print "Minix: PID <pid> created" everytime a new process is created and "Minix: PID <pid> exited" everytime a process ends.

To achieve this, the file *forkexit.c* located at *minix/servers/pm* is modified at appropriate place.

**Command: ./run.sh**

Then after rebooting the minix system, we can see the print statements
clearly on the screen whenever a process is created and ended. The
corresponding screenshot is given below:



Figure 2. Part II expected output

The processes are created in tree like fashion where parent process is created
first which creates a child process and processes exit in reverse order
generally, child process exits first and then parent process exits. There could
be cases where parent process exits unexpectedly, then the child process
becomes orphan process and init process adopts it and ends it, since a child
process cannot exist without its parent process.