

OPERATING SYSTEMS**1st Homework****Due on: Friday, February 10th, 2006****Submission: Send your homework through the e-mail: kurt@ce.itu.edu.tr****In this homework, you complete the following tasks:**

- * Learn to execute command lines
- * Learn how to handle background jobs

Preparation

- * For Task-1, see `exec()` function and the `fork()` system call
- * For Task-2, see `wait()` function

Download<http://www.cs.itu.edu.tr/~kurt/Courses/os/hw1.tar.gz>**Tasks**

Perform the following tasks:

1. Edit the `run_command.c` file so a child process is created to run the command, and the parent waits for the child process to terminate. Check for built in commands first; create a new process only for commands which are not built in. Use the parser to create from the command line the `argv` array passed to the child.

Working directory: `$HOME/hw1/task1`**Files provided:** `Makefile, shell.h, shell.c parse.c, builtin.c, run_command.c`After the file has been edited, type **make** or **make shell**.When you get the prompt, type **shell**.

The sample output is as follows:

```

$./shell
Next? -> ls -l
total 56
-rw-r--r--  1 kurtbin  users2      2353 May  6  2003 builtin.c
-rw-r--r--  1 kurtbin  users2      1548 May 22  2005 builtin.o
-rw-r--r--  1 kurtbin  users2        266 May 22  2005 Makefile
-rw-r--r--  1 kurtbin  users2         51 May  6  2003 object_defs
-rw-r--r--  1 kurtbin  users2     1406 May  6  2003 parse.c
-rw-r--r--  1 kurtbin  users2     1192 May 22  2005 parse.o
-rw-r--r--  1 kurtbin  users2     1014 May  6  2003 run_command.c
-rw-r--r--  1 kurtbin  users2     1680 May 22  2005 run_command.o
-rwxr-xr-x  1 kurtbin  users2     8468 Jan 27 10:55 shell
-rw-r--r--  1 kurtbin  users2        639 May  6  2003 shell.c
-rw-r--r--  1 kurtbin  users2        333 May  6  2003 shell.h
-rw-r--r--  1 kurtbin  users2     1308 May 22  2005 shell.o
Next? -> rm /tmp/trash
rm: cannot lstat `/tmp/trash': No such file or directory
Child 25360 exited with error status 1: Operation not permitted
Next? -> it has been snowing for 5 days
it: No such file or directory
Child 25589 exited with error status 2: No such file or directory
Next? -> quit

```

2. Edit the `is_background.c` file to detect an “&”. Alter the `run_command.c` file so that if a task is running in the background, the parent does not wait. Do not worry about background process becoming zombies at this point; this will be addressed later on the lectures.

Working directory: `$HOME/hw1/task2`

Files provided: `Makefile`, `shell.h`, `shell.c`, `parse.c`, `builtin.c`, `run_command.c`, `is_background.c`

After the file has been edited, type **make** or **make shell**.

When you get the prompt, type **shell**.

The sample output is as follows:

```
./shell
Next? -> sleep 300 &
Next? -> ps
  PID TTY          TIME CMD
 20789 pts/12    00:00:00 bash
 26546 pts/12    00:00:00 shell
 26606 pts/12    00:00:00 sleep
 26620 pts/12    00:00:00 ps
Next? -> quit
```