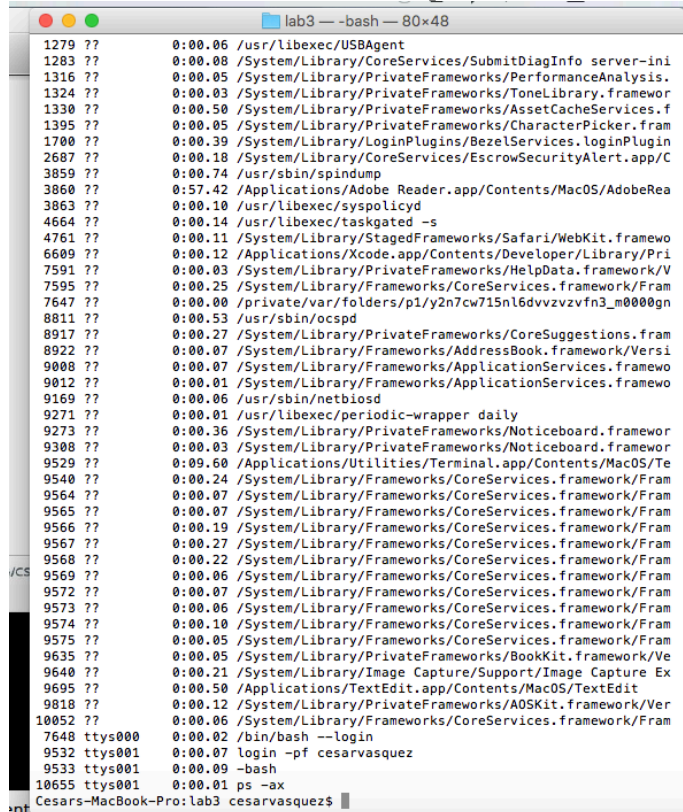-Cesar Vasquez
-Lab3 Report
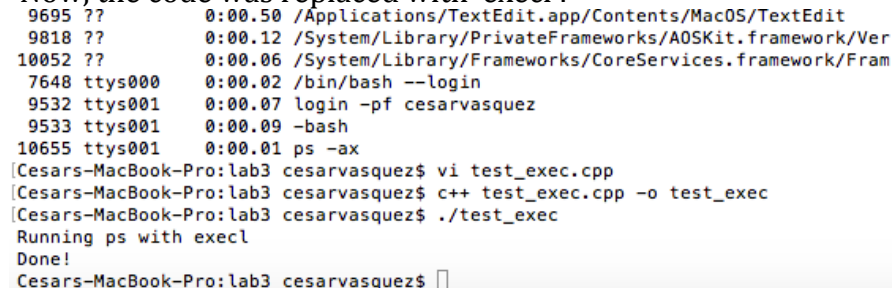-January 26, 2016

Lab Objective
-1. Replacing a process image:
-2. Duplicating a process image:
-3. Waiting for a process:
-4. Signals

-1. Replacing a process image:
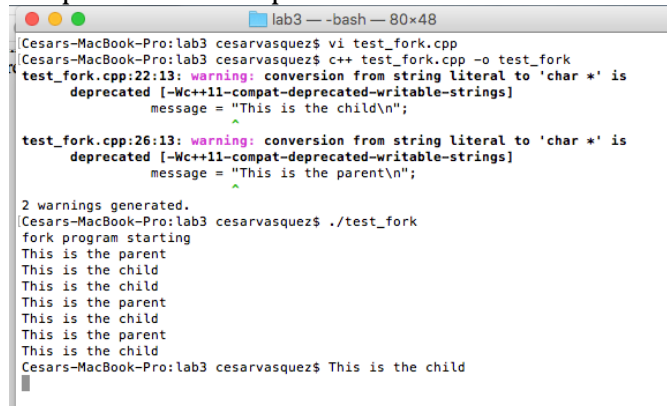-Below it's the code with 'execlp' code:

```
                 lab3 — -bash — 80×48
  1279 ??        0:00.06 /usr/libexec/USBAgent
  1283 ??        0:00.08 /System/Library/CoreServices/SubmitDiagInfo server-ini
  1316 ??        0:00.05 /System/Library/PrivateFrameworks/PerformanceAnalysis.
  1324 ??        0:00.03 /System/Library/PrivateFrameworks/ToneLibrary.framewor
  1330 ??        0:00.50 /System/Library/PrivateFrameworks/AssetCacheServices.f
  1395 ??        0:00.05 /System/Library/PrivateFrameworks/CharacterPicker.fram
  1700 ??        0:00.39 /System/Library/LoginPlugins/BezelServices.loginPlugin
  2687 ??        0:00.18 /System/Library/CoreServices/EscrowSecurityAlert.app/C
  3859 ??        0:00.74 /usr/sbin/spindump
  3860 ??        0:57.42 /Applications/Adobe Reader.app/Contents/MacOS/AdobeRea
  3863 ??        0:00.10 /usr/libexec/syspolicyd
  4664 ??        0:00.14 /usr/libexec/taskgated -s
  4761 ??        0:00.11 /System/Library/StagedFrameworks/Safari/WebKit.framewo
  6609 ??        0:00.12 /Applications/Xcode.app/Contents/Developer/Library/Pri
  7591 ??        0:00.03 /System/Library/PrivateFrameworks/HelpData.framework/V
  7595 ??        0:00.25 /System/Library/Frameworks/CoreServices.framework/Fram
  7647 ??        0:00.00 /private/var/folders/p1/y2n7cw715nl6dvvzvzvfn3_m0000gn
  8811 ??        0:00.53 /usr/sbin/ocspd
  8917 ??        0:00.27 /System/Library/PrivateFrameworks/CoreSuggestions.fram
  8922 ??        0:00.07 /System/Library/Frameworks/AddressBook.framework/Versi
  9008 ??        0:00.07 /System/Library/Frameworks/ApplicationServices.framewo
  9012 ??        0:00.01 /System/Library/Frameworks/ApplicationServices.framewo
  9169 ??        0:00.06 /usr/sbin/netbiosd
  9271 ??        0:00.01 /usr/libexec/periodic-wrapper daily
  9273 ??        0:00.36 /System/Library/PrivateFrameworks/Noticeboard.framewor
  9308 ??        0:00.03 /System/Library/PrivateFrameworks/Noticeboard.framewor
  9529 ??        0:09.60 /Applications/Utilities/Terminal.app/Contents/MacOS/Te
  9540 ??        0:00.24 /System/Library/Frameworks/CoreServices.framework/Fram
  9564 ??        0:00.07 /System/Library/Frameworks/CoreServices.framework/Fram
  9565 ??        0:00.07 /System/Library/Frameworks/CoreServices.framework/Fram
  9566 ??        0:00.19 /System/Library/Frameworks/CoreServices.framework/Fram
  9567 ??        0:00.27 /System/Library/Frameworks/CoreServices.framework/Fram
  9568 ??        0:00.22 /System/Library/Frameworks/CoreServices.framework/Fram
  9569 ??        0:00.06 /System/Library/Frameworks/CoreServices.framework/Fram
  9572 ??        0:00.07 /System/Library/Frameworks/CoreServices.framework/Fram
  9573 ??        0:00.06 /System/Library/Frameworks/CoreServices.framework/Fram
  9574 ??        0:00.10 /System/Library/Frameworks/CoreServices.framework/Fram
  9575 ??        0:00.05 /System/Library/Frameworks/CoreServices.framework/Fram
  9635 ??        0:00.05 /System/Library/PrivateFrameworks/BookKit.framework/Ve
  9640 ??        0:00.21 /System/Library/Image Capture/Support/Image Capture Ex
  9695 ??        0:00.50 /Applications/TextEdit.app/Contents/MacOS/TextEdit
  9818 ??        0:00.12 /System/Library/PrivateFrameworks/AOSKit.framework/Ver
 10052 ??        0:00.06 /System/Library/Frameworks/CoreServices.framework/Fram
  7648 ttys000   0:00.02 /bin/bash --login
  9532 ttys001   0:00.07 login -pf cesarvasquez
  9533 ttys001   0:00.09 -bash
 10655 ttys001   0:00.01 ps -ax
Cesars-MacBook-Pro:lab3 cesarvasquez$
```

-Now, the code was replaced with 'execl':

```
  9695 ??        0:00.50 /Applications/TextEdit.app/Contents/MacOS/TextEdit
  9818 ??        0:00.12 /System/Library/PrivateFrameworks/AOSKit.framework/Ver
 10052 ??        0:00.06 /System/Library/Frameworks/CoreServices.framework/Fram
  7648 ttys000   0:00.02 /bin/bash --login
  9532 ttys001   0:00.07 login -pf cesarvasquez
  9533 ttys001   0:00.09 -bash
 10655 ttys001   0:00.01 ps -ax
[Cesars-MacBook-Pro:lab3 cesarvasquez$ vi test_exec.cpp
[Cesars-MacBook-Pro:lab3 cesarvasquez$ c++ test_exec.cpp -o test_exec
[Cesars-MacBook-Pro:lab3 cesarvasquez$ ./test_exec
 Running ps with execl
 Done!
 Cesars-MacBook-Pro:lab3 cesarvasquez$
```

-2. Duplicating a process image:
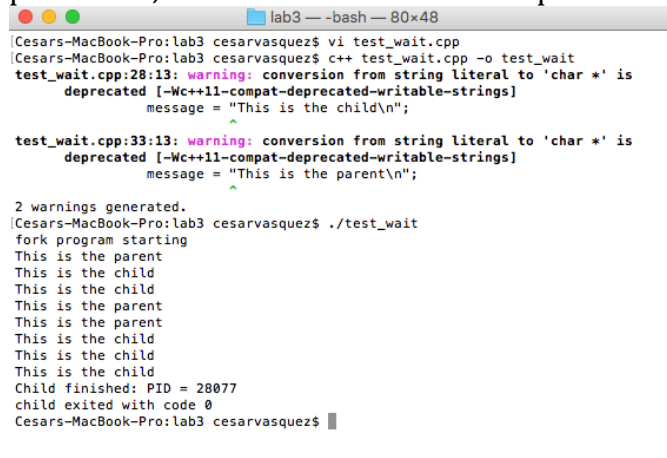
-Below is a screen shot of the code executing. The console displays when the process is a parent or child process.

```
● ● ●                      lab3 — -bash — 80×48
[Cesars-MacBook-Pro:lab3 cesarvasquez$ vi test_fork.cpp
[Cesars-MacBook-Pro:lab3 cesarvasquez$ c++ test_fork.cpp -o test_fork
test_fork.cpp:22:13: warning: conversion from string literal to 'char *' is
        deprecated [-Wc++11-compat-deprecated-writable-strings]
                message = "This is the child\n";
                          ^
test_fork.cpp:26:13: warning: conversion from string literal to 'char *' is
        deprecated [-Wc++11-compat-deprecated-writable-strings]
                message = "This is the parent\n";
                          ^
2 warnings generated.
[Cesars-MacBook-Pro:lab3 cesarvasquez$ ./test_fork
fork program starting
This is the parent
This is the child
This is the child
This is the parent
This is the child
This is the parent
This is the child
Cesars-MacBook-Pro:lab3 cesarvasquez$ This is the child
```

-3. Waiting for a Process:
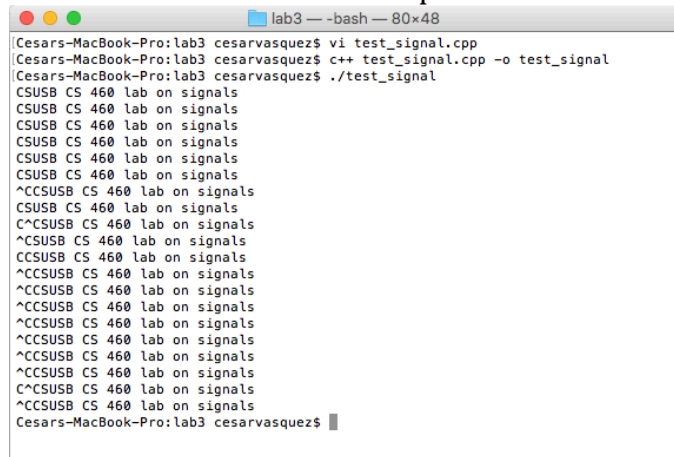
The code of this section is almost the same from the previous section, but the difference is that the parent waits for the child to finish. Then, the parent prints its process ID, and the code terminates. A picture is provide below:

```
● ● ●                      lab3 — -bash — 80×48
[Cesars-MacBook-Pro:lab3 cesarvasquez$ vi test_wait.cpp
[Cesars-MacBook-Pro:lab3 cesarvasquez$ c++ test_wait.cpp -o test_wait
test_wait.cpp:28:13: warning: conversion from string literal to 'char *' is
        deprecated [-Wc++11-compat-deprecated-writable-strings]
                message = "This is the child\n";
                          ^
test_wait.cpp:33:13: warning: conversion from string literal to 'char *' is
        deprecated [-Wc++11-compat-deprecated-writable-strings]
                message = "This is the parent\n";
                          ^
2 warnings generated.
[Cesars-MacBook-Pro:lab3 cesarvasquez$ ./test_wait
fork program starting
This is the parent
This is the child
This is the child
This is the parent
This is the parent
This is the child
This is the child
This is the child
Child finished: PID = 28077
child exited with code 0
Cesars-MacBook-Pro:lab3 cesarvasquez$
```
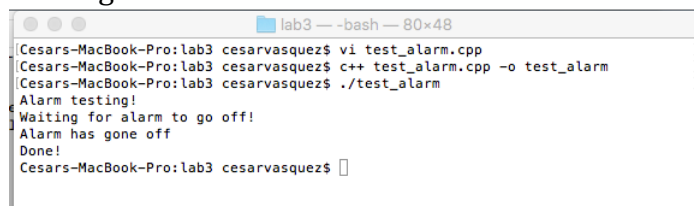
-4. Signals:

-The print screen of the code is below. When '^C' was press noting was happening because the code had a for loop with a limit of 20 times.

```
[Cesars-MacBook-Pro:lab3 cesarvasquez$ vi test_signal.cpp
[Cesars-MacBook-Pro:lab3 cesarvasquez$ c++ test_signal.cpp -o test_signal
[Cesars-MacBook-Pro:lab3 cesarvasquez$ ./test_signal
CSUSB CS 460 lab on signals
CSUSB CS 460 lab on signals
CSUSB CS 460 lab on signals
CSUSB CS 460 lab on signals
CSUSB CS 460 lab on signals
CSUSB CS 460 lab on signals
^CCSUSB CS 460 lab on signals
CSUSB CS 460 lab on signals
C^CSUSB CS 460 lab on signals
^CSUSB CS 460 lab on signals
CCSUSB CS 460 lab on signals
^CCSUSB CS 460 lab on signals
^CCSUSB CS 460 lab on signals
^CCSUSB CS 460 lab on signals
^CCSUSB CS 460 lab on signals
^CCSUSB CS 460 lab on signals
^CCSUSB CS 460 lab on signals
^CCSUSB CS 460 lab on signals
C^CSUSB CS 460 lab on signals
^CCSUSB CS 460 lab on signals
Cesars-MacBook-Pro:lab3 cesarvasquez$
```

-Now, for 'test_alarm', the code being executed is below. This occurs because fork is executed then it is stopped with sleep then re-executed with return 1. Finally, the void signal is send and the alarms is executed.

```
[Cesars-MacBook-Pro:lab3 cesarvasquez$ vi test_alarm.cpp
[Cesars-MacBook-Pro:lab3 cesarvasquez$ c++ test_alarm.cpp -o test_alarm
[Cesars-MacBook-Pro:lab3 cesarvasquez$ ./test_alarm
Alarm testing!
Waiting for alarm to go off!
Alarm has gone off
Done!
Cesars-MacBook-Pro:lab3 cesarvasquez$
```

-Summary:

This lab was kind of difficult, but I will still give my self 20/20.