**Class Activities CS 446**

**Chapter 3**

**Question 1:** Using the program in **Figure 3.30 (found on page 149 of the textbook)**, explain what the output will be at LINE A and why?

**Answer:**

The result is still 5 as the child updates its copy of value. When control returns to the parent, its value remains at 5.

**Question 2:** Including the initial parent process, how many processes are created by the program shown in **Figure 3.32 (found on page 151 of the textbook)**?

**Answer:**

8 processes are created. The program online includes printf() statements to better understand how many processes have been created.

**Question 3:** Using the program in **Figure 3.34 (found on page 152 of the textbook)**, identify the values of pid at lines A, B, C, and D. (Assume that the actual pids of the parent and child are 2600 and 2603, respectively.)

**Answer:**

A = 0, B = 2603, C = 2603, D = 2600

**Question 4:** Explain the role of the init process on UNIX and Linux systems in regard to process termination.

**Answer:**

When a process is terminated, it briefly moves to the zombie state and remains in that state until the parent invokes a call to wait(). When this occurs, the process id as well as entry in the process table are both released. However if a parent does not invoke wait(), the child process remains a zombie as long as the parent remains alive. Once the parent process terminates, the initprocess becomes the new parent of the zombie. Periodically, the init process calls wait() which ultimately releases the pid and entry in the process table of the zombie process.

**Question 5:** Using the program shown in **Figure 3.35 (found on page 153 of the textbook)**, explain what the output will be at lines X and Y.

**Answer:**

Because the child is a copy of the parent, any changes the child makes will occur in its copy of the data and won’t be reflected in the parent. As a result, the values output by the child at line X are 0, -1, -4, -9, -16. The values output by the parent at line Y are 0, 1, 2, 3, 4