

```
#include <stdio.h>
#include <unistd.h>
int main()
{
    int i;
    for (i = 0; i < 4; i++)
        fork();
    return 0;
}
```

1- Including the initial parent process, how many processes are created by the program shown above. Please explain (20pt).

The total number of processes created by forks is 2^n , where n is the number of fork calls, in this case it is 2^4 , or 16

2- Using the program below, 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.) (30pt).

```
#include <sys/types.h>
#include <stdio.h>
#include <unistd.h>
int main()
{
    pid_t pid, pid1;
    /* fork a child process */
    pid = fork();

    if (pid < 0) { /* error occurred */
        fprintf(stderr, "Fork Failed");
        return 1;
    }
    else if (pid == 0) { /* child process */
        pid1 = getpid();
        printf("child: pid = %d", pid); /* A */
        printf("child: pid1 = %d", pid1); /* B */
    }
    else { /* parent process */
        pid1 = getpid();
        printf("parent: pid = %d", pid); /* C */
        printf("parent: pid1 = %d", pid1); /* D */
        wait(NULL);
    }
    return 0;
}
```

A: 0
B: 2603
C: 2603
D: 2602

3- Using the program shown below, explain what the output will be at lines X and Y. (30pt).

```
#include <sys/types.h>
#include <stdio.h>
#include <unistd.h>
#define SIZE 5
int nums[SIZE] = {0,1,2,3,4};
int main()
{
    int i;
    pid_t pid;
    pid = fork();
    if (pid == 0) {
        for (i = 0; i < SIZE; i++) {
            nums[i] *= -i;
            printf("CHILD: %d ", nums[i]); /* LINE X */
        }
    }
    else if (pid > 0) {
        wait(NULL);
        for (i = 0; i < SIZE; i++)
            printf("PARENT: %d ", nums[i]); /* LINE Y */
    }
    return 0;
}
```

Line x will print
"CHILD: i" 5 times, where i is:
0, -1, -4, -9, -16
Line y will print
"PARENT": i", where i is:
0, 1, 2, 3, 4

4- Extra credit (20pt). Implement any of the above programs and check your results. Please provide the necessary files and screenshots of outputs.

Results matched my answers