

Assignment 1

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Question 1

- a) There will be four processes created.
- b) There will be four "c" variables generated for each process.
- c) Values stored in "c" variables before the termination are as follows:
 - i. 5
 - ii. 5
 - iii. 9
 - iv. 3

Question 2

C++ Code of the Given Process Tree

```

1  #include <stdio.h>
2  #include <unistd.h>
3  #include <sys/wait.h>
4
5
6  int main() {
7      int arr1[3];
8      for (int i = 0; i < 3; i++) {
9          int pid = fork();    // Create second generation
10         arr1[i] = pid;
11         if (!pid) {
12             int arr2[2];
13             pid = fork();    // Create third generation
14             arr2[0] = pid;
15             if (!pid) {
16                 int arr3[1];
17                 pid = fork(); // Forth generation leaf node
18                 arr3[0] = pid;
19                 if (!pid) {
20                     printf("<%d, [], %d>\n", getpid(), 4);
21                     _exit(0);

```

```

22         } else {
23             wait(NULL);
24         }
25         printf("<%d, [%d], %d>\n", getpid(),
26             arr3[0], 3);
27         _exit(0);
28     } else {
29         pid = fork();    // Third generation leaf node
30         arr2[1] = pid;
31         if (!pid) {
32             printf("<%d, [], %d>\n", getpid(), 3);
33             _exit(0);
34         } else {
35             wait(NULL);
36         }
37         wait(NULL);
38     }
39     printf("<%d, [%d, %d], %d>\n", getpid(),
40         arr2[0], arr2[1], 2);
41     _exit(0);
42 }
43 wait(NULL);
44 }
45 wait(NULL);
46 printf("<%d, [%d, %d, %d], %d", getpid(), arr1[0],
47     arr1[1], arr1[2], 1);
48 return 0;
49 }

```

Output Observed at the Terminal

```

1 <24917, [], 3>
2 <24918, [], 4>
3 <24916, [24918], 3>
4 <24915, [24916, 24917], 2>
5 <24921, [], 3>
6 <24922, [], 4>
7 <24920, [24922], 3>
8 <24919, [24920, 24921], 2>
9 <24925, [], 3>
10 <24926, [], 4>
11 <24924, [24926], 3>
12 <24923, [24924, 24925], 2>
13 <24914, [24915, 24919, 24923], 1

```
