Solution Copy

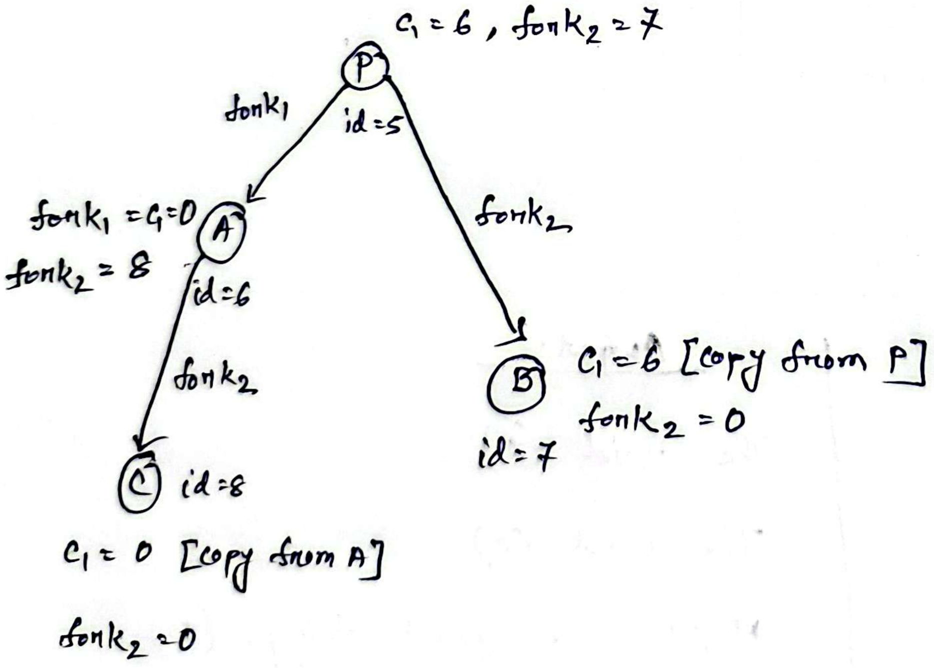
United International University
Course: Operating Systems (CSE 4509), Summer 2025
Class Test 1, Section: D
Total Marks: 20, Time: 30 minutes

1) Consider the following program

```
int c1 = fork();
         1
if(fork() || c1 == 0)
        2
{
    printf("Catch me\n");        ⇒ P, A, C
}
else if(c1 > 0)
{                                 ⇒ B
    waitpid(c1, NULL, 0);  ⟶ B waits for A
    printf("If you can\n");
}else
{
  exit(0);
    printf("Now you see me\n");
}
```

a) Draw the process tree for the above program [5]

b) What will be the output of the program? [3]



output:

Catch me (P)

Catch me (A)

If you can (B)

Catch me (C)

2) How does the shell (your terminal) execute commands? Explain using fork, wait and exec system calls. [4]

1) The terminal creates a copy of its own using fork when we write a command.

2) Then the terminal calls wait() to wait for the command to complete execution

3) The copy process calls exec() with the executable file path of the command, which then turns into that command and does the desired work.

4) After that the terminal returns from waiting and agains listens for our command.

3) Consider the following two programs. What will be the output if we run f1.c? [8]

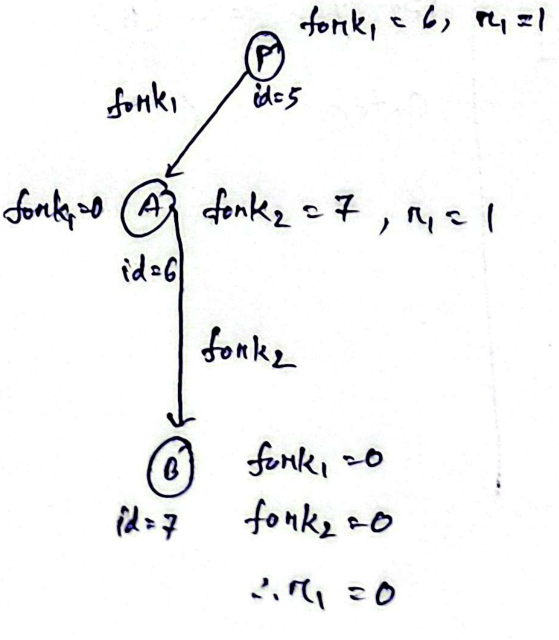
This is f1.c

```
int r1 = fork() || fork();
                1         2
if(r1 == 0)
{
    printf("Hope is a good thing\n");
    char *args[2];
    args[0] = strdup("./f3");
    args[1] = NULL;
    execvp(args[0], args);
    printf("May be the best of things\n");

}else
{
    printf("The End.\n");
}
```

This is f3 file

```
int main()
{
    printf("No good thing ever dies\n");
    return 0;
}
```



Output:

The End (P)

The End (A)

Hope is a good thing (B)

No good thing ever dies (B)