

Programming Lab – Sharing memory between processes

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1 Shared Memory

Each process has its own *distinct* context and does not share it with other processes. Memory is where the context is and therefore, if two processes need to share an information in memory, they need to create this bit of space explicitly. In this lab, you'll be experimenting with the different system functions used to create such a shared space.

Test out the following program and understand it.

```
#include <stdlib.h> #include
<stdio.h>
#include <string.h>
#include <sys/types.h>
#include <sys/shm.h>
#include <sys/wait.h>

#define KEY 4567
#define PERMS 0660

int main(int argc, char **argv) {
    int id; int i; int *ptr;
    system("ipcs -m");

    id = shmget(KEY, sizeof(int), IPC_CREAT | PERMS);
    system("ipcs -m");
    ptr = (int *) shmat(id, NULL, 0);
    *ptr = 54; i = 54;

    if (fork() == 0)
    { (*ptr)++; i++;
      printf("Value of *ptr = %d\nValue of i = %d\n", *ptr, i);
      exit(0);
    } else {
      wait(NULL);

      printf("Value of *ptr = %d\nValue of i = %d\n", *ptr, i);

      shmctl(id, IPC_RMID, NULL);
    }
}
```

```

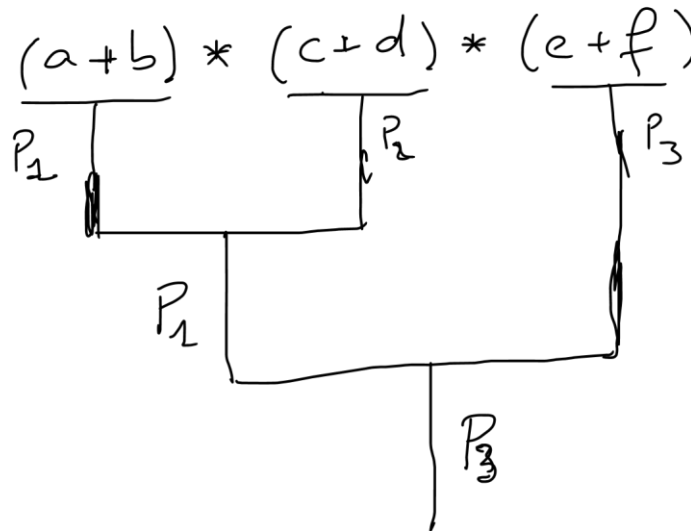
    }
}

```

1. What could you infer from the output regarding the state of `i` and `*ptr`?
2. Explain what the functions `shmget`, `shmat` do. What 's the need for a « KEY » here ?

2 Parallel Computing

Write a program that computes the following expression “ $(a + b) * (c + d) * (e + f)$ ” using 3 different processes.



3 Implementing Copy/Paste between processes

Create two independent **executables** ; Process 1 asks the user for input and the second one asks the user when to read the input from process 1, then displays it.

