UIT2512---Operating Systems Practices Lab

3) Inter Process Communication (IPC) using Pipes

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a) One Parent - One Child - Here, parent process writes into the pipe and the child reads from that pipe.

CODE:

```python
import os

def communication(child_writes):
    r, w = os.pipe()

    processid = os.fork()
    if processid:
        os.close(w)
        r = os.fdopen(r)
        print ("Parent reading")
        str = r.read()
        print( "Parent reads =", str)
    else:

        os.close(r)
        w = os.fdopen(w, 'w')
        print ("Child writing")
        w.write(child_writes)
        print("Child writes = ",child_writes)
        w.close()

child_writes = "Hello Everyone"
communication(child_writes)
```

OUTPUT:

```
Parent reading
Child writing
Child writes =  Hello Everyone
Parent reads = Hello Everyone
PS C:\Users\B Vasundhara\Documents\OS> []
```

b) Parent 1 - Child 11 & Parent 2- Child 21 - Twp Pipes.

CODE:

```python
import os

def ipc(parent_message, child_writes, pipe_read, pipe_write):
    process_id = os.fork()

    if process_id:
        # Parent process
        os.close(pipe_write)
        r = os.fdopen(pipe_read)
        print(f"Parent {os.getpid()} reading")
        message = r.read()
        print(f"Parent {os.getpid()} reads = {message}")
        r.close()
    else:
        # Child process
        os.close(pipe_read)
        w = os.fdopen(pipe_write, 'w')
        print(f"Child {os.getpid()} writing")
        w.write(child_writes)
        print(f"Child {os.getpid()} writes = {child_writes}")
        w.close()

    if process_id:
        os.wait()

if __name__ == "__main__":
    # Create two pipes for communication
    pipe_1_read, pipe_1_write = os.pipe()
    pipe_2_read, pipe_2_write = os.pipe()

    # Create two parent processes
    parent_1_pid = os.getpid()
    parent_2_pid = parent_1_pid + 1

    child_11 = os.fork()
    if child_11 == 0:
        ipc(f"Message from Parent {parent_1_pid} to Child 11!", "Child 11
Response", pipe_1_read, pipe_1_write)
        os._exit(0)

    child_21 = os.fork()
    if child_21 == 0:
        ipc(f"Message from Parent {parent_2_pid} to Child 21!", "Child 21
Response", pipe_2_read, pipe_2_write)
        os._exit(0)
```

```python
    os.close(pipe_1_read)
    os.close(pipe_1_write)
    os.close(pipe_2_read)
    os.close(pipe_2_write)

    os.waitpid(child_11, 0)
    os.waitpid(child_21, 0)
```

OUTPUT:

```
Parent 6956 reading
Parent 6956 reads = Message from Parent 6955 to Child 11!
Child 6958 writing
Child 6958 writes = Child 11 Response
Parent 6957 reading
Parent 6957 reads = Message from Parent 6956 to Child 21!
Child 6960 writing
Child 6960 writes = Child 21 Response
PS C:\Users\B Vasundhara\Documents\OS> []
```