CONCURRENCY PROGRAMMING

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# How Does a Program Start?

# Process and Thread – How are these different?

[]

## What is Process?

[write 2-5 lines]

## What is Thread?

[write 2-5 lines]

## Differences between Process and Thread?

… [Find at least 5 differences]

# Multiprocessing

## Advantages of multiprocessing

**[Advantages 1]**:

Example:

**[Advantages 2]**:

Example:

…

## Disadvantages of multiprocessing

**[Disadvantages 1]**:

Example:

**[Disadvantages 2]**:

Example:

…

## Multiprocessing in C++

### fork()

[Example]

[Return value of fork()]

### Data of process

[Demo how processes access its data.]

[Create a graph/diagram to demo how processes manage data]

## Concurrency/Data sharing in multiprocessing

### Shared memory

[Concept – 2-5 lines]

[Example code]

[Output of example code]

### Socket

[Concept – 2-5 lines]

[Example code]

[Output of example code]

### Named Pipe

[Concept – 2-5 lines]

[Example code]

[Output of example code]

# Multithreading

## Advantages of multithreading

**[Advantages 1]**:

Example:

**[Advantages 2]**:

Example:

…

## Disadvantages of multithreading

**[Disadvantages 1]**:

Example:

**[Disadvantages 2]**:

Example:

…

## Multithreading in C++

[Example with no concurrency]

[Output of example]

## Concurrency in multithreading

### <mutex>

**[Concept – 2-5 lines]**

**[Example code]**

**[Output of example code]**

### <condition\_variable>

[Concept – 2-5 lines]

[Example code]

[Output of example code]

### Semaphore concept

[Concept – 2-5 lines]

[Example code]

[Output of example code]