

Lab 1 - Basic Concurrency in Java

- Group 18
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Task 1: Simple Synchronization

Task 1a: Race Conditions

Source files:

- `task1/MainA.java` (main file)

To compile and execute:

```
» javac MainA.java
   java Main
```

Task 1b: Synchronized Keyword

Source files:

- `task1/MainB.java` (main file)

To compile and execute:

```
» javac MainB.java
   java Main
```

Task 1c: Synchronization Performance

Source files:

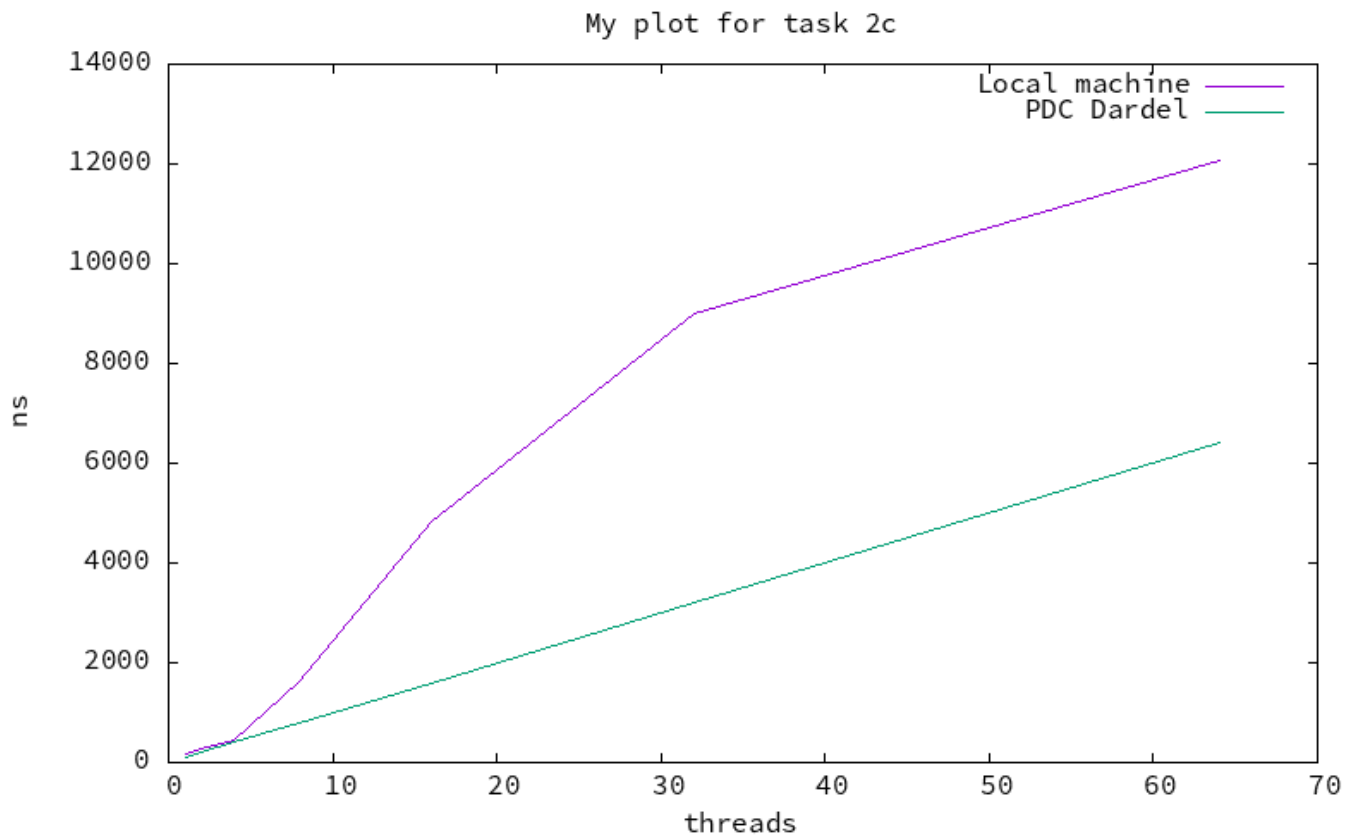
- `task1/MainC.java` (main file)

To compile and execute:

```
» javac MainC.java
   java Main <N>
```

Where N is number of threads to execute with.

In figure 1, we see how the execution time scaled with the number of threads:



Task 2: Guarded Blocks using `wait()/notify()`

Task 2a: Asynchronous Sender-Receiver

Source files:

- `task2/MainA.java` (main file)

To compile and execute:

```
➤ javac MainA.java
  java Main
```

Task 2b: Busy-waiting Receiver

Source files:

- `task2/MainB.java` (main file)

To compile and execute:

```
» javac MainB.java
   java Main
```

Task 2c: Waiting with Guarded Block

Source files:

- task2/MainC.java (main file)

To compile and execute:

```
» javac MainC.java
   java Main
```

Task 2d: Guarded Block Performance

Source files:

- task2/MainD.java (main file)

To compile and execute:

```
» javac MainD.java
   java Main
```

Task 3: Producer-Consumer Buffer using Condition Variables

Task 3a: Implementation

Source files:

- task3/Buffer.java

To compile and execute:

```
» javac Buffer.java
```

Task 3b: Program using Buffer Class

Source files:

- task3/Main.java (main file)
- task3/Buffer.java

To compile and execute:

```
➤ javac Main.java Buffer.java
  java Main
```

Task 4: Counting Semaphore

Task 4a: Implementation

Source files:

- task4/CountingSemaphore.java

To compile and execute:

```
➤ javac CountingSemaphore.java
```

Task 4b: Program using Counting Semaphore

Source files:

- task4/Main.java (main file)
- task4/CountingSemaphore.java

To compile and execute:

```
➤ javac Main.java CountingSemaphore.java
  java Main
```

Task 5: Dining Philosophers

Task 5a: Model the Dining Philosophers

Source files:

- task5/MainA.java (main file)

To compile and execute:

```
➤ javac MainA.java  
  java Main
```

Task 5b: Solution Implementation

Source files:

- task5/MainB.java (main file)

To compile and execute:

```
➤ javac MainB.java  
  java Main
```