领略 Kotlin 协程的力量

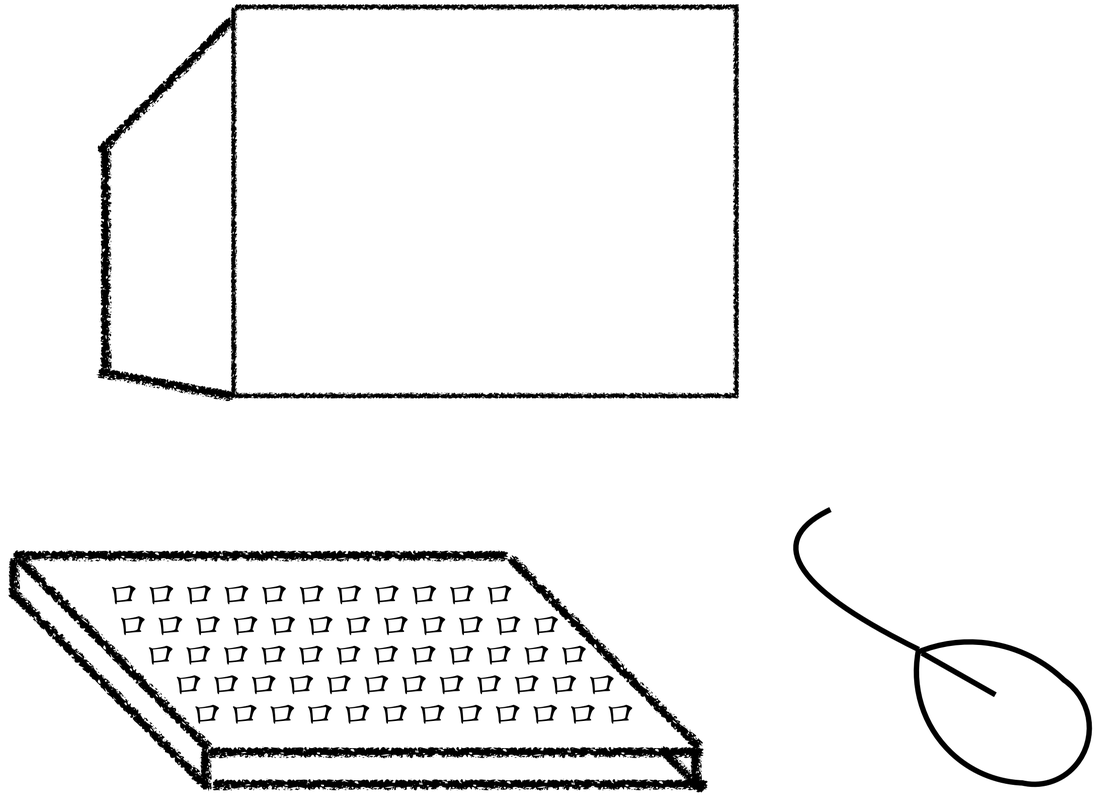
张涛

饿了么 Android

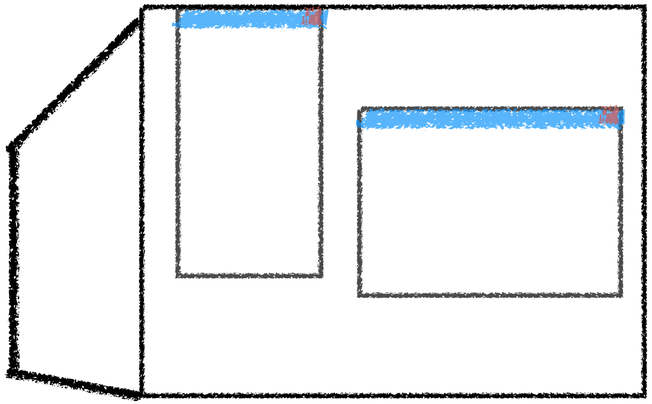
博客：开源实验室

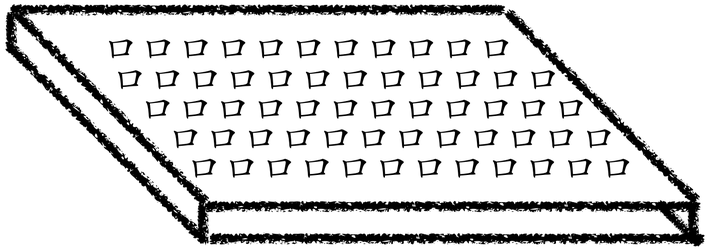
微信：kymjs123

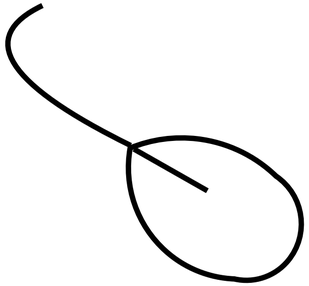
协程是什么



一次执行一个任务

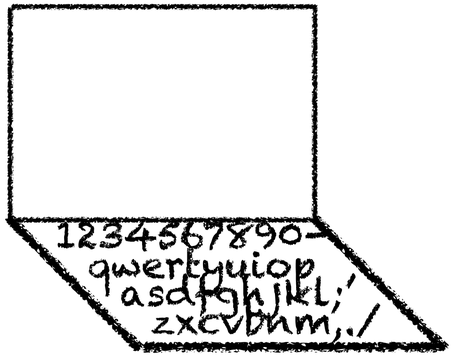


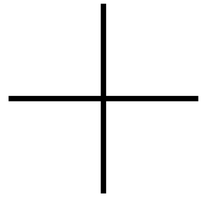




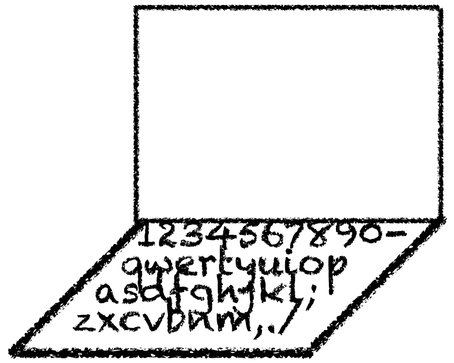
你执行一会，他执行一会

单CPU时间分片

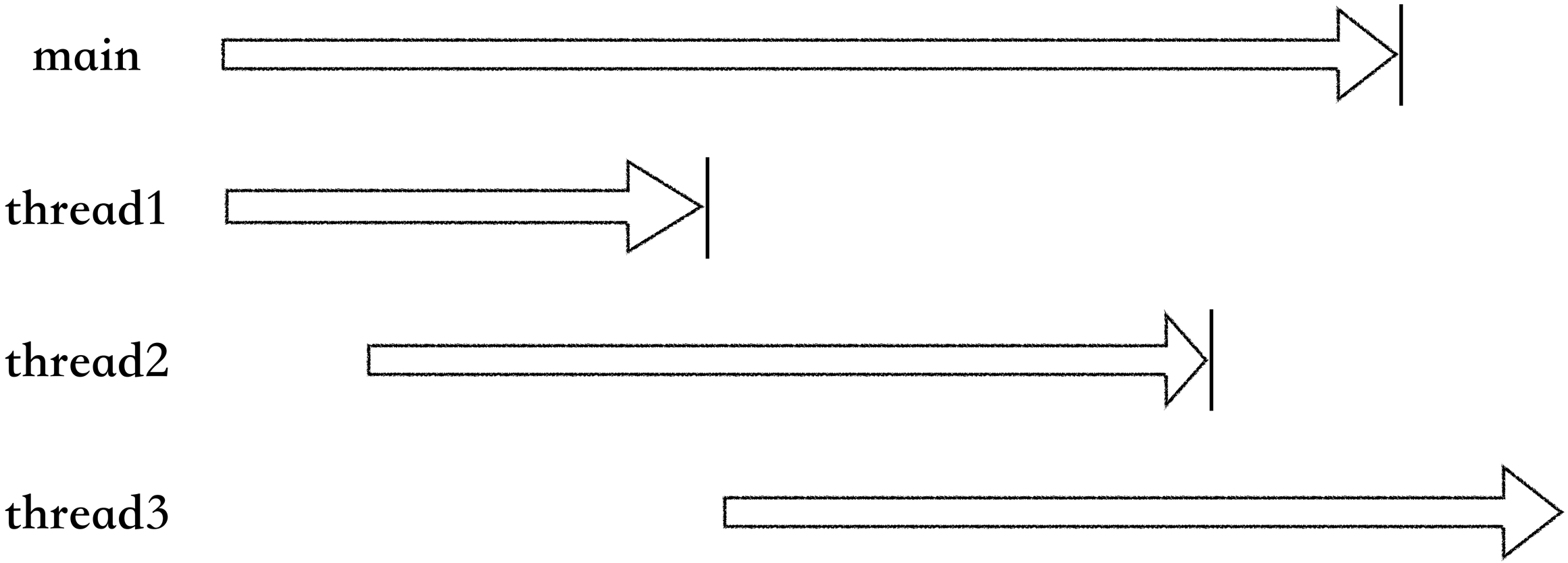


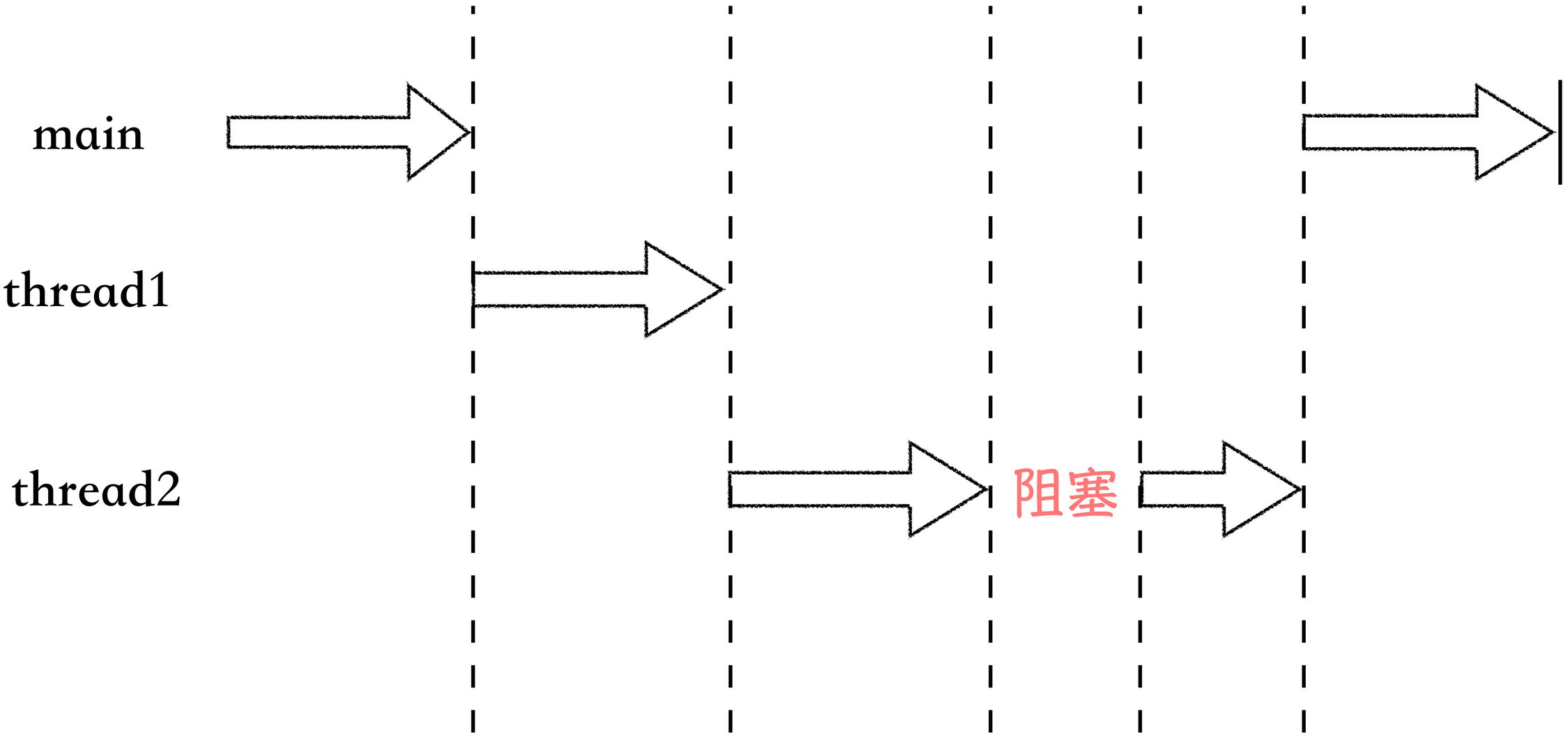


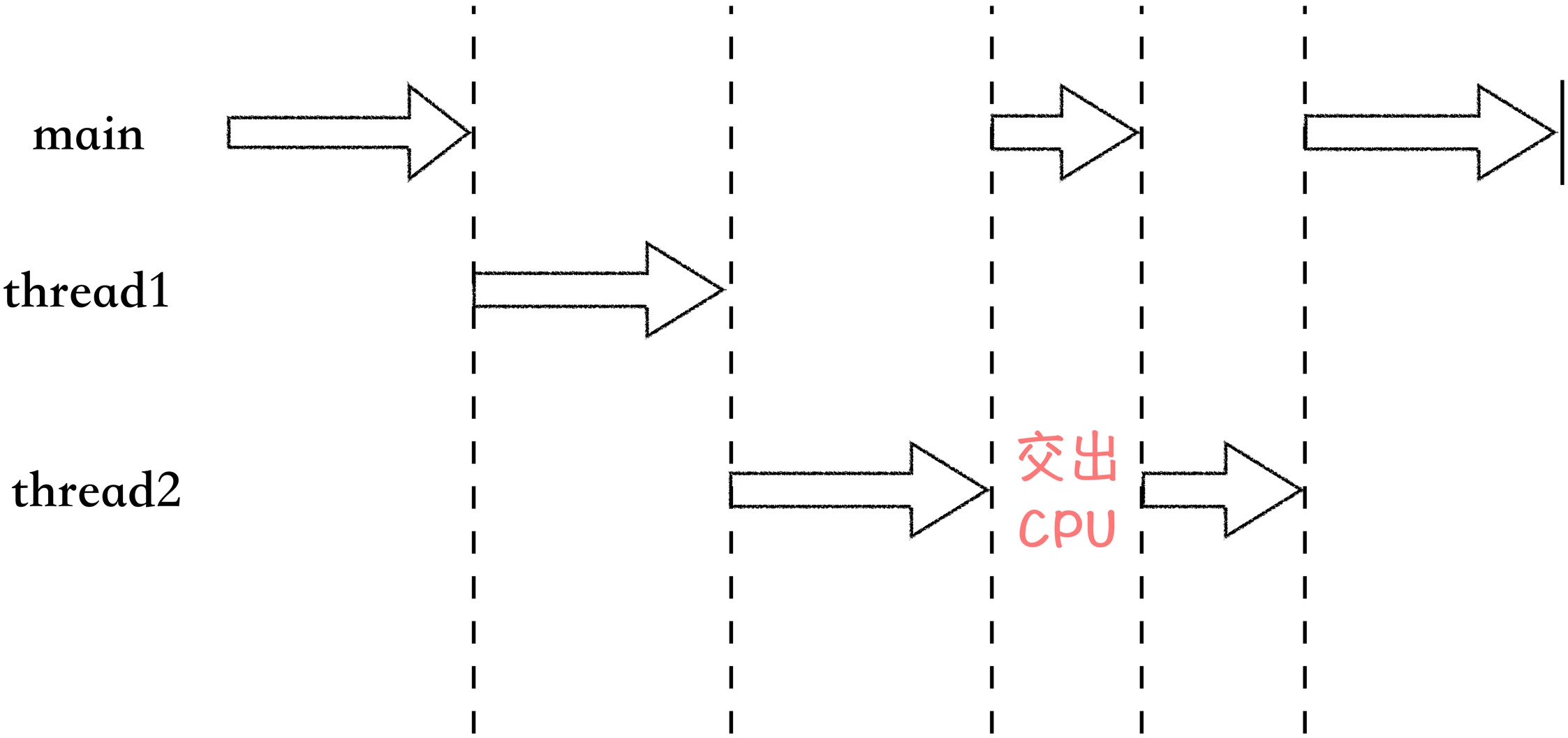
多CPU并行执行



并发执行更多任务


main
thread1
thread2
thread3


main
thread1
thread2
阻塞


main
thread1
thread2
交出
CPU

通过提升 CPU 利用率，减少线程切换
进而提升程序运行效率

- 可控制：协程能做到可被控制的发起子任务
- 轻量级：协程非常小，占用资源比线程还少
- 语法糖：使多任务或多线程切换不再使用回调语法

通过 Kotlin
在 JVM 平台使用协程

示例：第三方登录

```
fun signinWith() {
    val token = requestToken()
    val user = requestUserInfo(token)
    setText(user.name)
}
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    requestToken{ token ->
        requestUserInfo(token){user ->
            setText(user.name)
        }
    }
}
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```
fun signinWith() {
    requestToken{ token ->
        requestUserInfo(token){user ->
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        }
    }
}
```

用协程实现

```
fun signinWith() = runBlocking {
    val token = requestToken()
    val user = requestUserInfo(token)
    setText(user.name)
}
```

```
fun signinWith() = runBlocking {
    val token = requestToken()
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启动协程

- **runBlocking : T** // 用于执行协程任务，通常只用于启动最外层协程
- **launch : Job** // 用于执行协程任务
- **async/await : Deferred** // 用于执行协程任务，并得到执行结果

```
fun setText(name: String) = launch(UI) {
    textView.text = name
}
```

```
suspend fun requestToken() = async(CommonPool) {
    return@async "curl http://www.example.com”
}.await()
```

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suspend 关键字

suspend 修饰的函数(或 lambda),
只能被 suspend 修饰的函数(或 lambda)调用

suspend

```
suspend fun requestToken(): String { … }

Object requestToken(Continuation<String> c) { … }
```

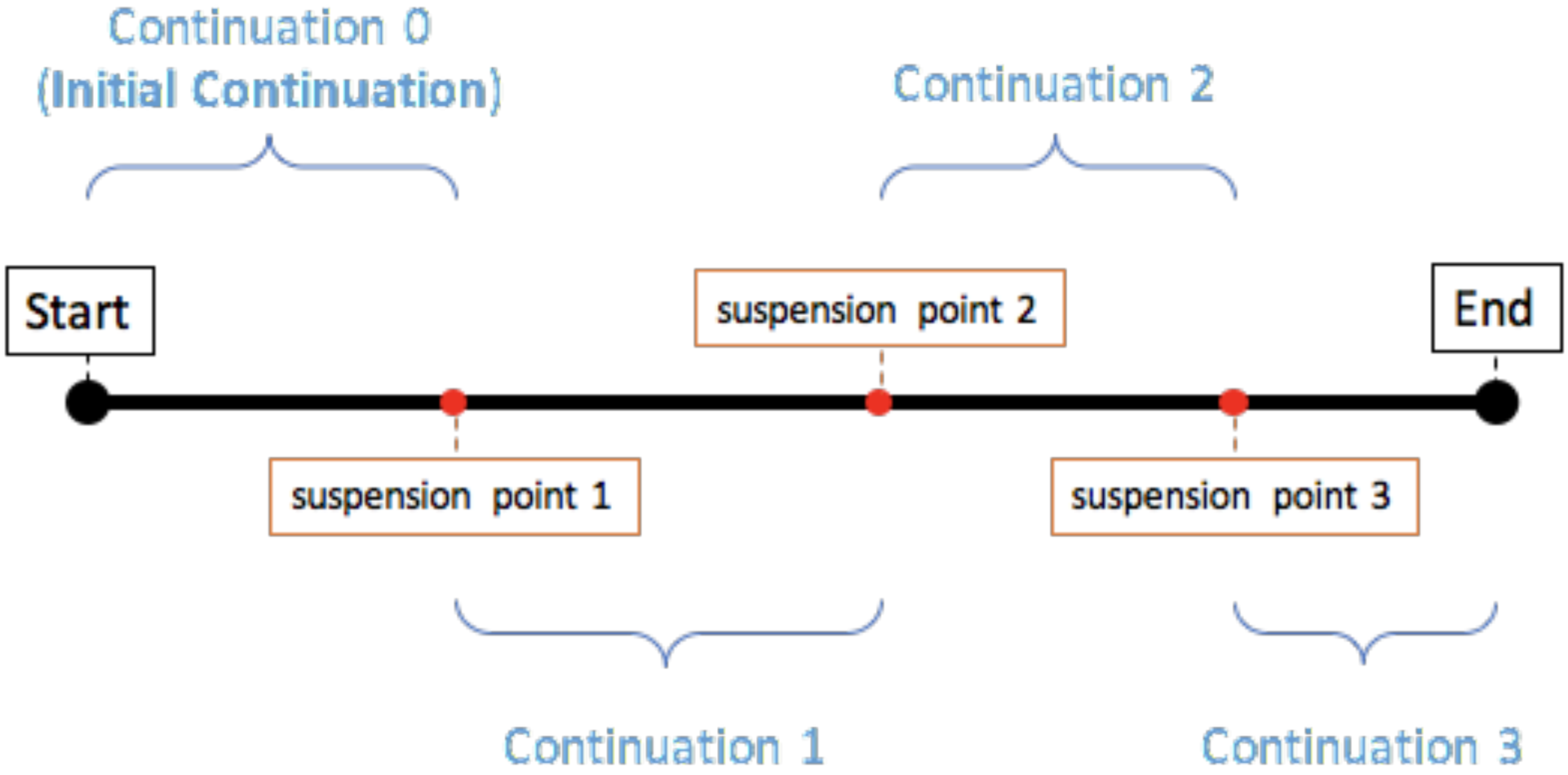
Continuation

```
suspend fun requestToken(): String { … }

Object requestToken(Continuation<String> c) { … }
```

```
interface Continuation<in T> {
    val context: CoroutineContext
    fun resume(value: T)
    fun resumeWithException(e: Throwable)
}
```

多协程组合： suspension & Continuation



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```
fun signinWith() = runBlocking {
    val token = requestToken()
    val user = requestUserInfo(token)
    setText(user.name)
}
```

协程的切换

```
class Main$signinWith$1 : CoroutineImpl(){
    override fun doResume(any: Any){
        switch(this.label){
            case 0:
                this.label = 1
                requestToken(this)
            case 1:
                this.label = 2
                requestUserInfo(token, this)
            case 2:
                setText(name)
        }
    }
}
```

在现有项目引入协程

```
interface Service {
    fun requestTokens(): Call<Token>
}
```

```
suspend fun requestToken(): String =
    serviceInterface.requestToken().await()
```

定义扩展方法

```
suspend fun <T> Call<T>.await(): T {
    ...
}
```

定义扩展方法

```
suspend fun <T> Call<T>.await() =
                    suspendCoroutine<T> { continuation ->

    enqueue(object : Callback<T> {
        override fun onResponse(c: Call<T>, r: Response<T>) {
            continuation.resume(r.body()!!)
        }

        override fun onFailure(c: Call<T>?, t: Throwable) {
            continuation.resumeWithException(t)
        }
    })
}
```

改进 I/O 操作

```
fun save(textView: TextView, file: File) =
                                    runBlocking {
    val text = textView.text.toString()
    val deferred = async(CommonPool) {
        file.appendText(text)
        file.readText()
    }
    deferred.await()
}
```

目标方向

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Thanks