**Grand Central Dispatch (GCD)**

**What is GCD?**

GCD is the marketing name for **libdispatch**, Apple’s library that provides support for concurrent code execution on multicore hardware on iOS and OS X.

### **Serial and Concurrent Queues**

A dispatch queue can be either serial, so that work items are executed one at a time, or it can be concurrent, so that work items are dequeued in order, but run all at once and can finish in any order. Both serial and concurrent queues process work items in first in, first-out (FIFO) order.

There are three queue types:

* Serial Main Queue
* Global Dispatch Queue: background, low, default, high.
* Custom Serial / Concurrent Queue.

### **Synchronous and Asynchronous Execution**

Each work item can be executed either *synchronously* or *asynchronously*. When a work item is executed synchronously with the sync method, the program waits until execution finishes before the method call returns. When a work item is executed asynchronously with the async method, the method call returns immediately.

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| **Functions** | **Meaning** |
| dispatch\_sync | Submits an application-defined function for synchronous execution on a dispatch queue. |
| dispatch\_async | Submits a block for asynchronous execution on a dispatch queue and returns immediately. |
| dispatch\_after | Enqueue a block for execution at the specified time. |
| dispatch\_once | Executes a block object once and only once for the lifetime of an application. |
| dispatch\_barrier\_async | Submits a barrier block for asynchronous execution and returns immediately. |
| dispatch\_barrier\_sync | Submits a barrier block object for execution and waits until that block completes. |
| dispatch\_group\_wait | Waits synchronously for the previously submitted block objects to complete; returns if the blocks do not complete before the specified timeout period has elapsed. |
| dispatch\_group\_notify | Schedules an application-defined function to be submitted to a queue when a group of previously submitted block objects have completed. |