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Lab 2

1.

First off, the client that is starting the job will make contact with the Resource Manager, and request an application so that it has an application ID assigned to it. Then, the client will set up the files and resources on HDFS, ensuring it has the proper amount of resources, including the replication factor. This will generally consist of copying the JAR file over to HDFS, as well as any input files if they are not already there. From there, it submits the final information needed to run the application to the ResourceManager so that it can start. The ResourceManager will take this information and will place the application into a scheduling queue, eventually spinning up a new application master process for the application. The application master will now keep track of a job's progress, report it to the client, and will also restart any tasks that fail or stop, but most importantly, it calculates input splits, and creates map tasks for the input splits. With these splits, the application master then spins up a few reduce tasks determined by the job configuration, and then decides *how* to run the tasks: if the task is small enough (< 10 mappers) then it is run on the same JVM as the app master, otherwise, it spins up new JVM's and the job setup method is run for each JVM. After spinning up the JVM's, the application master will send a request for nodes to run the tasks on, including information about the tasks' data locality, which the scheduler uses (along with memory requirements) to decide what task will run on which machine. From there, the tasks will run when they are able, and the application master will view their progress, restarting them if they die (up to a maximum of 4 times), and when the job is finally complete, the application master and all the JVM's clean their states, and reset to wait for the next job.