

Homework 5

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Link to GitHub Repo: <https://github.com/coreymaxedon/hw5>

Question 1

The commit history has three commits. One with the initial commit of the blank files. One with updated `llr_functions.R` and `test_llr.R` files. One with an updated `benchmark_llr.R` file. We have one branch called `master` that is pointing to the last commit. The `HEAD` is pointing to `master`.

Question 2 (the first time)

After creating a new branch, `HEAD` is pointing to `speed-test-1`. After making changes, the `master` will point to the older commit, while `speed-test-1` will point to the new commit that contains our new changes.

Question 2 (the second time)

We used `apply` and separated by column. Since only the diagonal of `Wz` has numbers, this is equivalent to each element of a `Wz` vector (diagonal values of original `Wz`) being multiplied by each row of `X` and `y`.

Question 3

The new version is much faster. The `speed-test-1` version cut the median time in half.

Question 4

We used `sweep` and the `*` operator. `Sweep` works like `apply`. `*` multiplies element by element of each vector. This works the same since `Wz` was originally just a diagonal matrix. The other numbers would be zero except the piece of `X` or `y` multiplied by the diagonal element.

Question 5

The fastest version was `speed-test-2`. The speed up over `speed-test-1` was pretty marginal. Essentially, the same operation is happening in a slightly different way. We also did `speed-test-extra`. We realized the `*` operator would recycle `Wz` in `Wz * X`. Surprisingly, `speed-test-2` was still the fastest.

Results: **Master:** Unit: milliseconds `expr min lq mean median uq max neval source("llr_functions.R")`
452.1253 467.8461 596.8217 501.992 619.4566 1977.729 100

speed-test-1: `expr min lq mean median uq max neval source("llr_functions.R")` 221.8562 241.0305 291.3232
252.2806 336.5498 893.165 100

speed-test-2 `expr min lq mean median uq max neval source("llr_functions.R")` 209.3638 221.2804 273.8552
229.4321 320.9144 787.7929 100

Question 6

We get a timeline of commit on each branch. This gave the history of every commit on every branch including the time the commit was done and who committed the update. The comment was also included.