Research question:

What is the optimal way of generating Ambient Occlusion at runtime using Vulkan?

The 3 ways of ambient occlusion I am comparing will be Screen Space Ambient Occlusion (SSAO), Horizon Based Ambient Occlusion(HBAO) and Ground Truth Ambient Occlusion (GTAO). They will be compared in terms of looks, in terms of performance and in terms of memory usage

Hypotheses:

* In terms of looks
  + “GTAO will look better than HBAO and SSAO”
  + “HBAO will look better than SSAO but worse than HBAO”
  + “SSAO will look worse than both GTAO and HBAO”
* - In terms of performance
  + “GTAO will perform better than HBAO and SSAO”
  + “HBAO will perform better than SSAO but worse than HBAO”
  + “SSAO will perform worse than both GTAO and HBAO”
* - In terms of memory usage
  + “GTAO and HBAO will have the same RAM usage and will both be better than SSAO”
  + “All 3 methods will have the same VRAM usage”

Methodology:

In terms of looks:

* Quantitative: Questionnaire

In terms of performance:

* Quantitative: Experimental performance Benchmarking

In terms of memory usage:

* Quantitative: Memory Usage Benchmarking

Parameters of experiment:

In terms of looks:

* The 3 techniques will be displayed on the same model. We can switch out the model and disable the textures for more emphasis on the lighting.

In terms of performance:

* For each technique, measure performance, we can switch out the model, samplecount and screensize for a variety of measurements

In terms of memory usage:

* For each technique, measure RAM and VRAM usage, we can switch out the model, samplecount and screensize for a variety of measurement