

Detailed guide for PA2 -- Written by Myung-Bae Son

1. Create a new sampler for pbrt.
  - A. Recommend to copy one of the existing implementations of samplers from here:  
*src/samplers*  
Clone any of pairs of header and source file and build your own sampler from it.
  - B. See *Physically Based Rendering: From Theory to Implementation* (2<sup>nd</sup> edition), chapter 7.1 ~ 7.2 to implement.
2. Make your new sampler to be accessible from pbrt.
  - A. Modify `MakeSampler()` function from *src/core/api.cpp*.
3. After finishing the implementation, modify one of the scenes to work with your sampler.
  - A. Open the file with text editor, and delete the line starting with "Renderer" (without quote). Example:  
*Renderer "metropolis" "integer samplesperpixel" [128] ...*  
Deleting this line will enable the renderer that uses a sampler module.
  - B. Add a sampler description and parameters into the file. Example:  
*Sampler "sampledistribute" "integer initialspp" [16] "integer totalsamples" [10291264]*  
Make sure to match the name of the sampler and the parameters that you have set in `MakeSampler()` and `Create*Sampler()`. An example modification of `metal.pbrt` file is given.
4. Run and compare the results.
  - A. You must create a reference image to compare MSE with another. Try to run with existing samplers on high quality setting. Example:  
*Sampler "adaptive" "integer minsamples" [32] "integer maxsamples" [256]*
  - B. Run with your sampler, and compare the result with the reference image.  
*Sampler "sampledistribute" "integer initialspp" [16] "integer totalsamples" [10291264]*
  - C. Run with another sampler (e.g. stratified sampler), and compare the result with the reference image  
*Sampler "stratified" "integer xsamples" [8] "integer xsamples" [8]*

Be sure to make your sampler pick the same number of samples as the existing sampler does.

D. Get MSE from each result and compare the quality of each other with exrdiff tool.

> *exrdiff reference.exr stratified.exr*

> *exrdiff reference.exr sampledistribute.exr*