

# Fundamentals of Computer Graphics

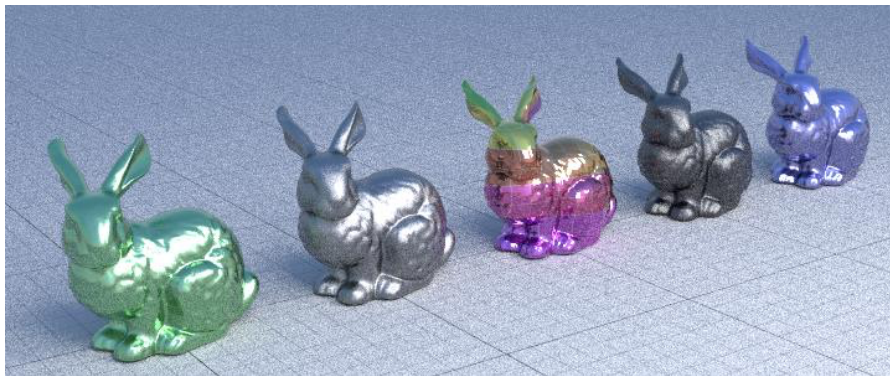
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- **Matcap shading:** The first extra credit I made is a shader for non-realistic matcap shading. While I was making the plastic material for the main shader I noticed that while trying to get the material light right I've got a strange effect of "sweaty rabbits". Once I got the material right I started to focus on the extra credits work and I've seen that the matcap shading effect was exactly the same effect that I was getting for error. So I got through my git commits, got what caused that effect and applied it again. The piece of code that does that edit the incoming ray and instead of computing it using the `sample_hemisphere_cos` function uses the `reflect` function. This way we get a perfect matcap effect.

Switching the MATCAP variable to true, building the project and running the following command generate the image below

```
./bin/yraytrace --scene tests/13_matcap/matcap.json --output out/lowres/13_matcap_720_256.jpg --samples 256 --resolution 720
```



- **Cell shading:** The second extra credit I did is a shader for non-realistic rendering following the cell shading example provided in the readme file. Following the code in the linked article with some adjustments I managed to get the desired toon effect within the `shade_toon` function

Running the following command generate the image below

```
./bin/yraytrace --scene tests/02_matte/matte.json --output out/lowres/14_toon_720_9.jpg --samples 9 --shader toon --resolution 720
```

