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wmcdonal

CS 488 Assignment 4

# Manual

The DAG is not flattened into a tree structure in this ray tracer.

The extra feature is antialiasing via supersampling. A supersampling rate over both x and y can be defined (e.g. 3x3). Each pixel of the image is averaged over that many sub-pixels. This is implemented by increasing the “nx” and “ny” parameters to the ray tracer (“screen size”), and then dividing the resulting colour of each “pixel” by the product of the supersampling parameters. The pixels are then inserted into the properly sized image by performing integer division by the supersampling rates.

The unique scene demonstrates the hierarchy through reusing a fractal sphere. It includes a scaled buckyball to demonstrate the mesh, and a cube for good measure.

sum is: /usr/bin/sum

2015-06-24 02:51      Checksum for A4 for wmcdonal on gl15      Page 1

A4:

total 1560

```
25861650 drwxrwxr-x 2 wmcdonal wmcdonald 8192 Jun 24 02:51 src/
25861631 drwxrwxr-x 4 wmcdonal wmcdonald 4096 Jun 24 02:49 ./
95594244 -rwxr-xr-x 1 wmcdonal wmcdonald 1532 Jun 24 02:49 README*
68832776 -rw-r--r-- 1 wmcdonal wmcdonald 190326 Jun 24 02:48 screenshot01.png
25861632 drwxrwxr-x 2 wmcdonal wmcdonald 4096 Jun 24 02:47 data/
129680451 drwxrwx--- 7 wmcdonal cs488 4096 Jun 24 02:46 ../
68832773 -rwxr-xr-x 1 wmcdonal wmcdonald 681199 Jun 24 02:43 rt_antialias*
68832772 -rwxr-xr-x 1 wmcdonal wmcdonald 681199 Jun 24 02:43 rt*
```

A4/src:

total 216

```
25861650 drwxrwxr-x 2 wmcdonal wmcdonald 8192 Jun 24 02:51 ./
25861631 drwxrwxr-x 4 wmcdonal wmcdonald 4096 Jun 24 02:49 ../
70988537 -rw-r--r-- 1 wmcdonal wmcdonald 301 Jun 24 02:29 xform.hpp
70988536 -rw-r--r-- 1 wmcdonal wmcdonald 1201 Jun 24 02:29 xform.cpp
105293837 -rw-r--r-- 1 wmcdonal wmcdonald 306 Jun 24 02:29 ViewConfig.hpp
105293836 -rw-r--r-- 1 wmcdonal wmcdonald 386 Jun 24 02:29 Ray.hpp
105293834 -rw-r--r-- 1 wmcdonal wmcdonald 298 Jun 24 02:29 PixelTransformer.hpp
105293833 -rw-r--r-- 1 wmcdonal wmcdonald 1525 Jun 24 02:29 PixelTransformer.cpp
105293832 -rw-r--r-- 1 wmcdonal wmcdonald 948 Jun 24 02:29 HitRecord.hpp
105293831 -rw-r--r-- 1 wmcdonal wmcdonald 245 Jun 24 02:29 HitRecord.cpp
27312557 -rw-r--r-- 1 wmcdonal wmcdonald 9 Jun 24 02:29 .gitignore
27312556 -rw-r--r-- 1 wmcdonal wmcdonald 136 Jun 24 02:29 scene_lua.hpp
27312555 -rw-r--r-- 1 wmcdonal wmcdonald 15958 Jun 24 02:29 scene_lua.cpp
27312554 -rw-r--r-- 1 wmcdonal wmcdonald 2371 Jun 24 02:29 scene.hpp
27312553 -rw-r--r-- 1 wmcdonal wmcdonald 2610 Jun 24 02:29 scene.cpp
27312552 -rw-r--r-- 1 wmcdonal wmcdonald 1815 Jun 24 02:29 primitive.hpp
27312551 -rw-r--r-- 1 wmcdonal wmcdonald 5228 Jun 24 02:29 primitive.cpp
27312550 -rw-r--r-- 1 wmcdonal wmcdonald 966 Jun 24 02:29 polyroots.hpp
27312549 -rw-r--r-- 1 wmcdonal wmcdonald 47780 Jun 24 02:29 polyroots.cpp
27312548 -rw-r--r-- 1 wmcdonal wmcdonald 1024 Jun 24 02:29 mesh.hpp
27312547 -rw-r--r-- 1 wmcdonal wmcdonald 4324 Jun 24 02:29 mesh.cpp
27312546 -rw-r--r-- 1 wmcdonal wmcdonald 791 Jun 24 02:29 material.hpp
27312545 -rw-r--r-- 1 wmcdonal wmcdonald 1008 Jun 24 02:29 material.cpp
27312544 -rw-r--r-- 1 wmcdonal wmcdonald 276 Jun 24 02:29 main.cpp
27312543 -rw-r--r-- 1 wmcdonal wmcdonald 170 Jun 24 02:29 lua488.hpp
27312542 -rw-r--r-- 1 wmcdonal wmcdonald 242 Jun 24 02:29 light.hpp
27312541 -rw-r--r-- 1 wmcdonal wmcdonald 409 Jun 24 02:29 light.cpp
27312540 -rw-r--r-- 1 wmcdonal wmcdonald 1740 Jun 24 02:29 image.hpp
27312539 -rw-r--r-- 1 wmcdonal wmcdonald 6056 Jun 24 02:29 image.cpp
27312538 -rw-r--r-- 1 wmcdonal wmcdonald 10006 Jun 24 02:29 algebra.hpp
27312537 -rw-r--r-- 1 wmcdonal wmcdonald 3622 Jun 24 02:29 algebra.cpp
95233476 -rw-r--r-- 1 wmcdonal wmcdonald 752 Jun 24 02:29 a4.hpp
95233475 -rw-r--r-- 1 wmcdonal wmcdonald 3322 Jun 24 02:29 a4.cpp
25861651 -rw-r--r-- 1 wmcdonal wmcdonald 663 Jun 24 02:29 Makefile
```

A4/data:

total 1072

```
25861631 drwxrwxr-x 4 wmcdonal wmcdonald 4096 Jun 24 02:49 ../
25861632 drwxrwxr-x 2 wmcdonal wmcdonald 4096 Jun 24 02:47 ./
107820547 -rw-r--r-- 1 wmcdonal wmcdonald 2600 Jun 24 02:44 sample.lua
```

25861648 -rw-r--r-- 1 wmcdonal wmcdonald 36395 Jun 24 02:42 simple-cows.png  
 25861646 -rw-r--r-- 1 wmcdonal wmcdonald 49565 Jun 24 02:37 simple-cows-antialias.png  
 25861639 -rw-r--r-- 1 wmcdonal wmcdonald 137262 Jun 24 02:36 sample.png

2015-06-24 02:51      Checksum for A4 for wmcdonal on gl15      Page 2

25861641 -rw-r--r-- 1 wmcdonal wmcdonald 122281 Jun 24 02:32 sample\_noantialias.png  
 25861638 -rw-r--r-- 1 wmcdonal wmcdonald 137124 Jun 24 02:32 nonhier.png  
 25861636 -rw-r--r-- 1 wmcdonal wmcdonald 135511 Jun 24 02:32 nonhier-bb.png  
 25861635 -rw-r--r-- 1 wmcdonal wmcdonald 151657 Jun 24 02:32 nonhier\_antialias.png  
 25861649 -rw-r--r-- 1 wmcdonal wmcdonald 36166 Jun 24 02:29 macho-cows.png  
 25861647 -rw-r--r-- 1 wmcdonal wmcdonald 8859 Jun 24 02:29 smstdodeca.lua  
 25861645 -rw-r--r-- 1 wmcdonal wmcdonald 2907 Jun 24 02:29 simple-cows.lua  
 25861644 -rw-r--r-- 1 wmcdonal wmcdonald 1268 Jun 24 02:29 readobj.lua  
 25861643 -rw-r--r-- 1 wmcdonal wmcdonald 1470 Jun 24 02:29 nonhier2.lua  
 25861642 -rw-r--r-- 1 wmcdonal wmcdonald 1281 Jun 24 02:29 nonhier.lua  
 25861640 -rw-r--r-- 1 wmcdonal wmcdonald 2845 Jun 24 02:29 macho-cows.lua  
 25861637 -rw-r--r-- 1 wmcdonal wmcdonald 2857 Jun 24 02:29 hier.lua  
 25861634 -rw-r--r-- 1 wmcdonal wmcdonald 180010 Jun 24 02:29 cow.obj  
 25861633 -rw-r--r-- 1 wmcdonal wmcdonald 4322 Jun 24 02:29 buckyball.lua

A4

A4/data		
A4/data/buckyball.lua	10689	5
A4/data/cow.obj	57991	176
A4/data/hier.lua	09954	3
A4/data/macho-cows.lua	09303	3
A4/data/macho-cows.png	01895	36
A4/data/nonhier2.lua	25636	2
A4/data/nonhier_antialias.png	12965	149
A4/data/nonhier-bb.png	16300	133
A4/data/nonhier.lua	03278	2
A4/data/nonhier.png	58120	134
A4/data/readobj.lua	57040	2
A4/data/sample.lua	02718	3
A4/data/sample_noantialias.png	24130	120
A4/data/sample.png	08509	135
A4/data/simple-cows-antialias.png	47533	49
A4/data/simple-cows.lua	10797	3
A4/data/simple-cows.png	20864	36
A4/data/smstdodeca.lua	02544	9
A4/README	41575	2
A4/rt	29556	666
A4/rt_antialias	17257	666
A4/screenshot01.png	33960	186
A4/src		
A4/src/a4.cpp	39162	4
A4/src/a4.hpp	30832	1
A4/src/algebra.cpp	51100	4
A4/src/algebra.hpp	13384	10
A4/src/.gitignore	45676	1
A4/src/HitRecord.cpp	60049	1

A4/src/HitRecord.hpp	37094	1
A4/src/image.cpp	30943	6
A4/src/image.hpp	61824	2
A4/src/light.cpp	59872	1
A4/src/light.hpp	22020	1
A4/src/lua488.hpp	04702	1
A4/src/main.cpp	38275	1
A4/src/Makefile	56031	1
A4/src/material.cpp	14588	1
A4/src/material.hpp	39121	1

2015-06-24 02:51      Checksum for A4 for wmcdonal on gl15      Page 3

A4/src/mesh.cpp	41669	5
A4/src/mesh.hpp	03100	1
A4/src/PixelTransformer.cpp	15324	2
A4/src/PixelTransformer.hpp	21551	1
A4/src/polyroots.cpp	59889	47
A4/src/polyroots.hpp	52382	1
A4/src/primitive.cpp	04838	6
A4/src/primitive.hpp	11735	2
A4/src/Ray.hpp	13663	1
A4/src/scene.cpp	29007	3
A4/src/scene.hpp	46736	3
A4/src/scene_lua.cpp	04874	16
A4/src/scene_lua.hpp	33354	1
A4/src/ViewConfig.hpp	31289	1
A4/src/xform.cpp	15625	2
A4/src/xform.hpp	21236	1