

CT4201/EC4215: Computer Graphics

Introduction

BOCHANG MOON



About Me

- Assistant professor in Institute of Integrated Technology at GIST
 - Graduate Program of Culture Technology
 - Joined GIST in Sep. 2016
- Post-Doctoral researcher at Disney Research (Nov. 2014 – July 2016)
- Ph.D from KAIST (Feb. 2008 – Aug. 2014)
- Main research topics:
 - Computer graphics
 - Photorealistic rendering



About TA

- Jeongmin Gu
- TA email: ta.cg.gist@gmail.com



Information

- Instructor: Bochang Moon
- Email: bmoon@gist.ac.kr
- Office: 106 Dasan Building

- Office hours
 - 1:00 – 3:00pm on Mon. or by appointment (via email)

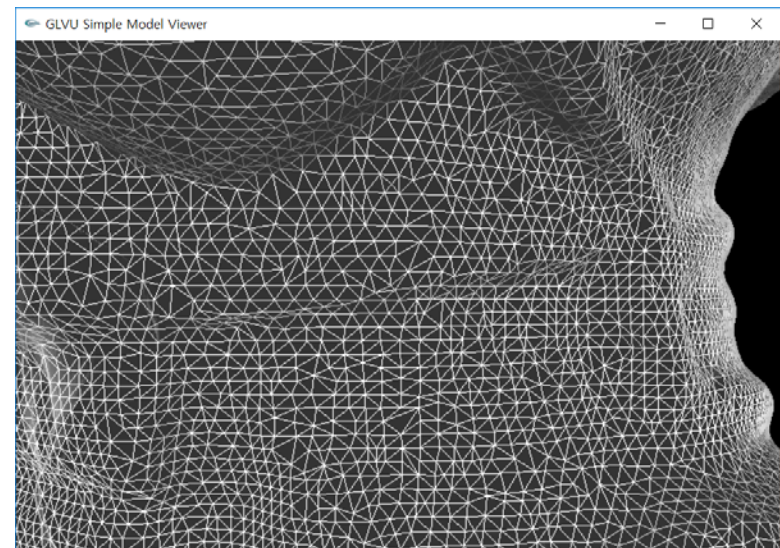
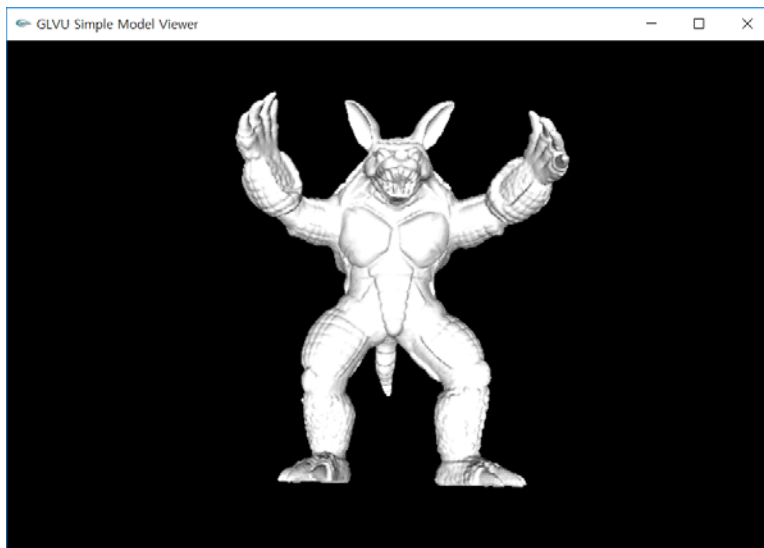
- Class time
 - 10:30 – 12:00pm on Mon. and Wed. (offline if coronavirus finishes)
 - Pre-recorded video files will be given.

Information

- Attendance for online case?
 - Should leave one-line comments in the youtube link
 - Your comment should include:
 - Your name, student ID

Graphics Areas

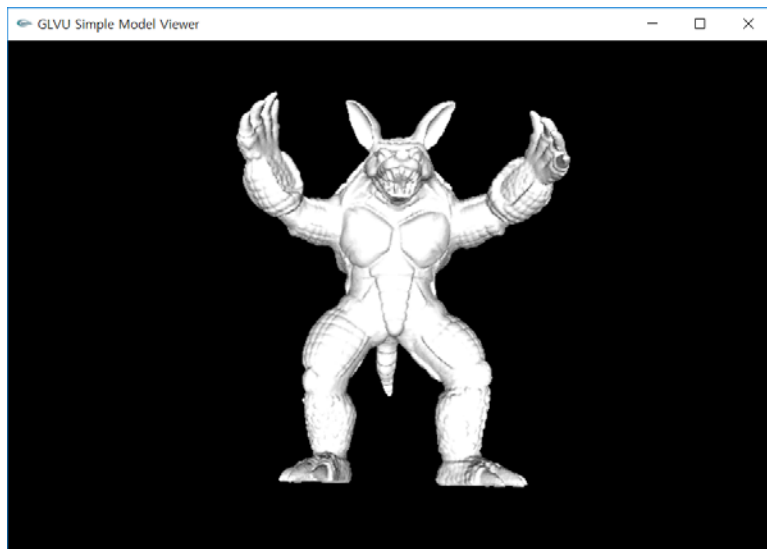
- Modeling
 - A technique to deal with mathematical specification of shape and appearance that can be stored in computers



e.g., triangle mesh

Graphics Areas

- Rendering
 - A algorithm to generate digital images from 3D models



3D model

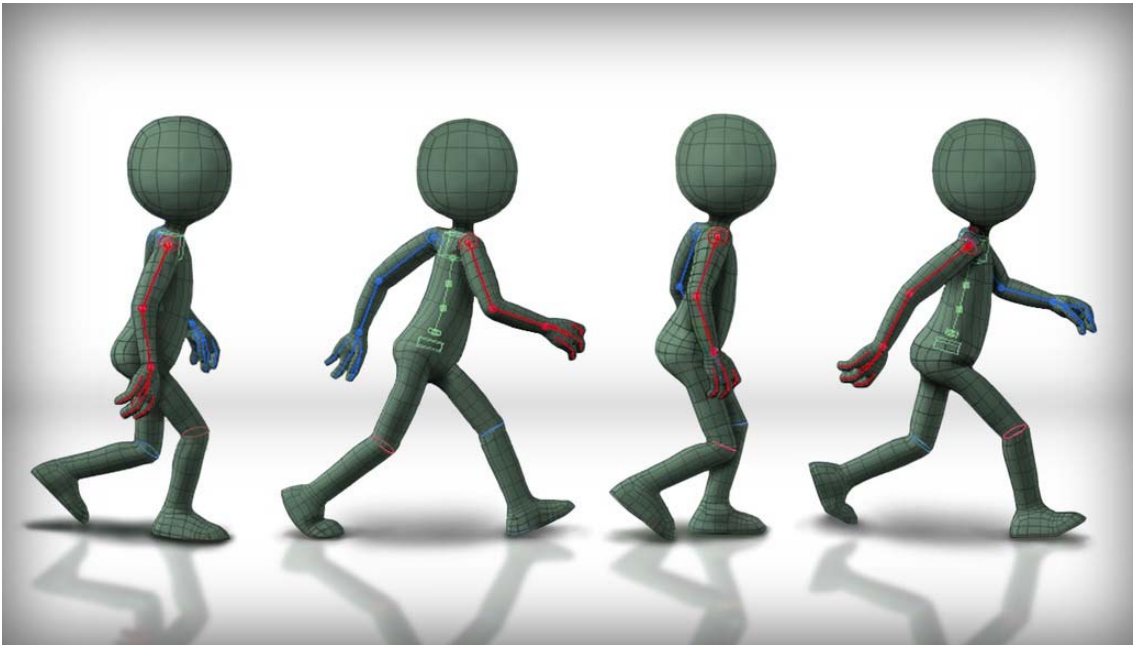


Rendered image



Graphics Areas

- Animation
 - Address how to create motion of virtual models over time



Images from <http://www.digitaltutors.com>

Graphics Areas

- Core areas
 - Modeling
 - Rendering
 - Animation
- Other areas
 - User Interface
 - Virtual Reality
 - Visualization
 - Image Processing
 - 3D scanning
 - Computational photography
 - etc.

Application of Computer Graphics

- 3D Animation



Application of Computer Graphics

- Visual Effects in Movies



from <http://wonderfulengineering.com>

Application of Computer Graphics

- Games



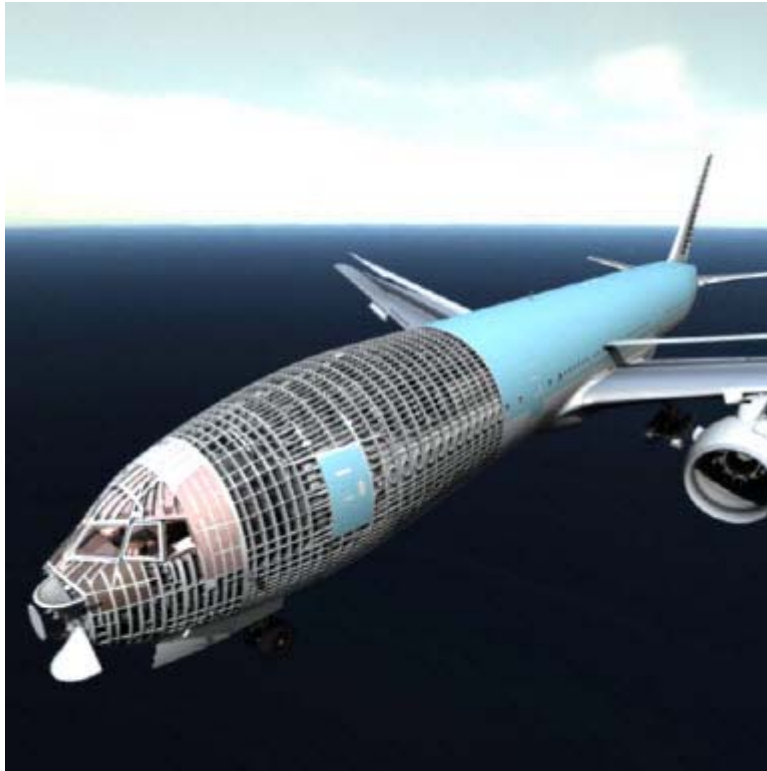
Application of Computer Graphics

- Augmented and virtual reality



Application of Computer Graphics

- Visualization



[Kim et al. 2013]

Some Recent Images



from pbrt.org

Some Recent Images

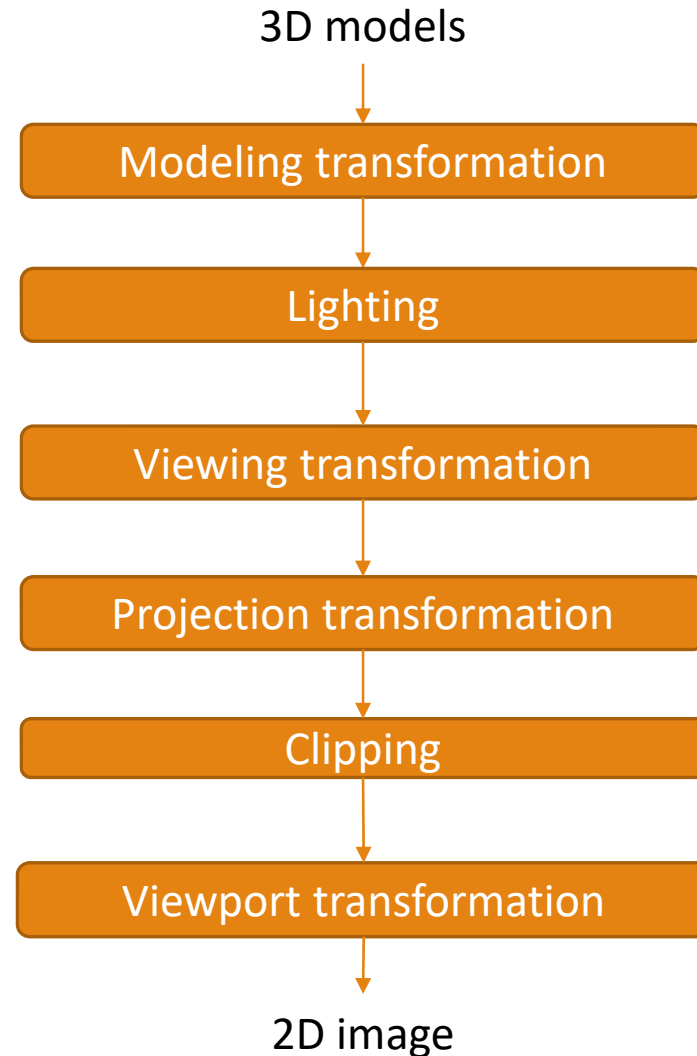


from pbrt.org

Course Overview

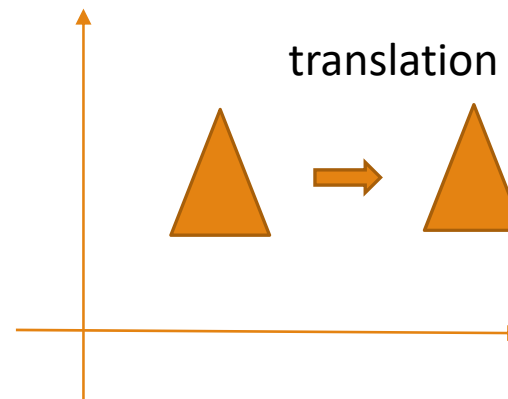
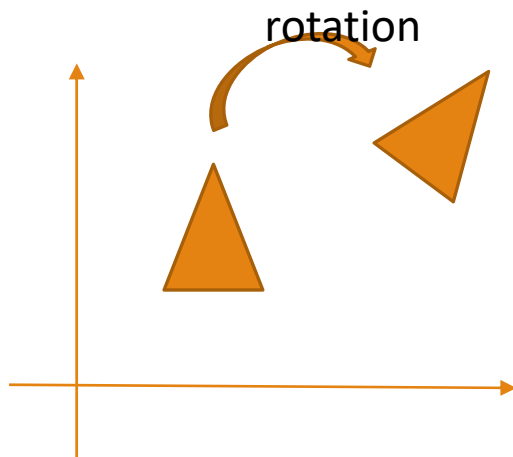
- Provide fundamental concepts of computer graphics such as graphics
 - Graphics pipeline & rasterization
 - Transformation
 - Local illumination and shading
 - Texture mapping
 - Ray casting
 - Ray tracing
 - Global illumination
- Learn how to generate digital images from virtual objects, lights, etc.

Graphics Pipeline and Rasterization



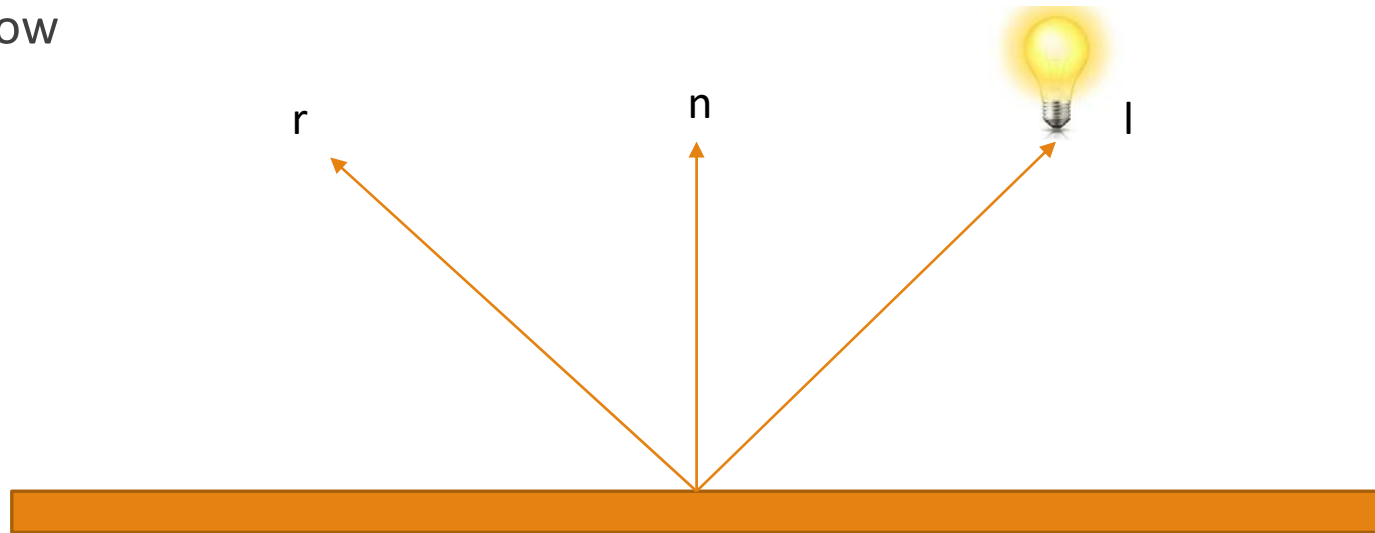
Transformations

- Affine transformations
- Viewing transformation
- ...

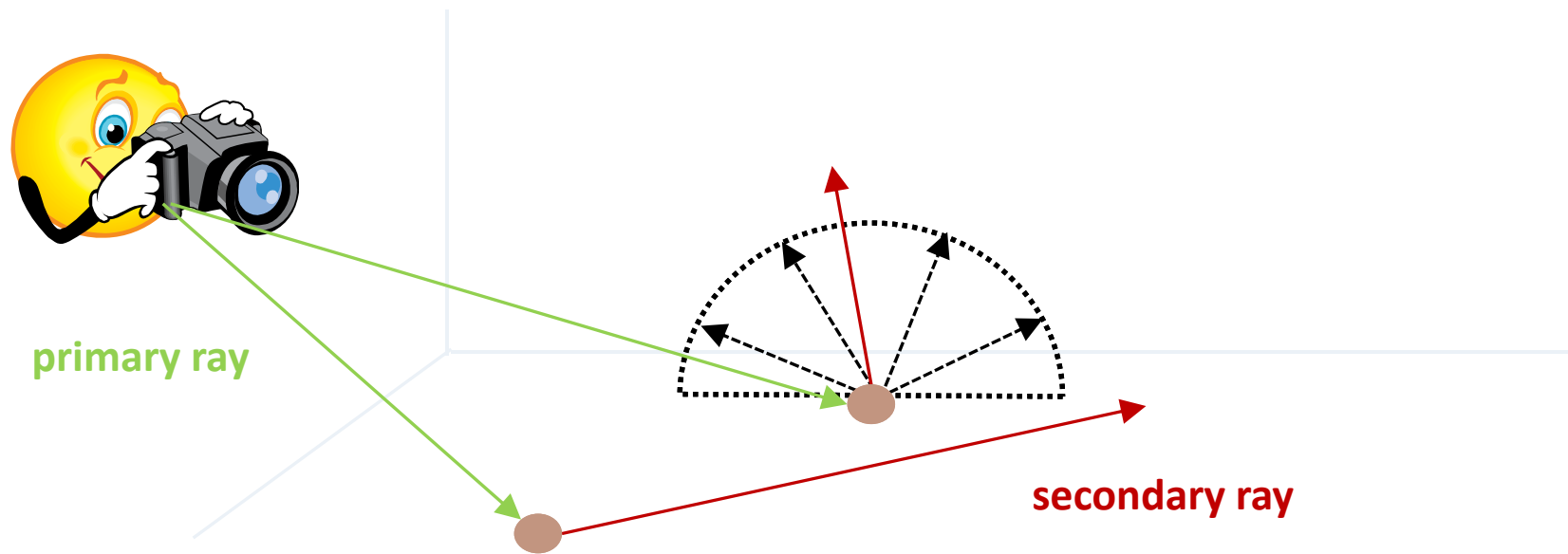


Local Illumination and Shading

- Shading
 - Flat
 - Gouraud
 - Phong
- Shadow



Ray Casting and Tracing



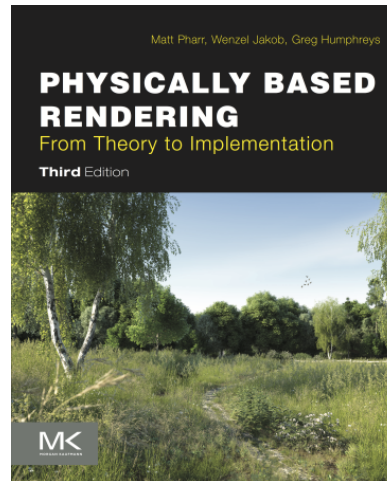
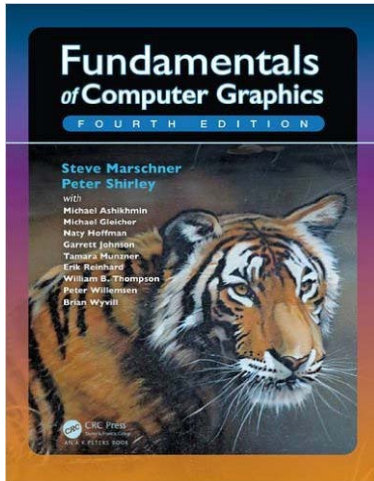
Global Illumination

- Simulate realistic lighting
 - Reflections
 - Refractions
 - Shadows
 - Diffuse inter-reflections
 - Caustics

- Global illumination methods
 - Path tracing
 - Photon mapping

Textbook and References

- Book



- Papers

- <http://kesen.realtimerendering.com/>
- SIGGRAPH, SIGGRAPH Asia, etc.



Grading

- No Mid-term exam
- Final-term exam: 50%
- Programming assignment: 40%
- Attendance: 10%
 - No absences: 10, One absences: 9, Two absences: 7, Three absences: 4
 - Four or more absences: 0

Prerequisite for This Course

- Basic C/C++ programming knowledge
 - e.g., if you can implement a simple program, you will be okay.