TIEA311
Tietokonegrafiikan perusteet
kevät 2019

("Principles of Computer Graphics" – Spring 2019)

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TIEA311 Tietokonegrafiikan perusteet – kevät 2019 ("Principles of Computer Graphics" – Spring 2019)

Adapted from: *Wojciech Matusik*, and *Frédo Durand*: 6.837 Computer Graphics. Fall 2012. Massachusetts Institute of Technology: MIT OpenCourseWare, https://ocw.mit.edu/.

Frontpage of the local course version, held during Spring 2019 at the Faculty of Information technology, University of Jyväskylä:
`http://users.jyu.fi/~nieminen/tgp19/`

TIEA311 - Today in Jyväskylä
We start by discussion, reflection and **questions**!

Work in groups of 3 students if possible:

- ► Fast warm-up: 90 seconds evenly split between group members (30s each in groups of 3), no interruptions from others: Foremost feelings right now?

- ► Reflection: Silent work, solo, 1 minute, **list words on paper**: What have you learned during the first course week?

- ► Interaction: 2 minutes group discussion: Compare if you learned the same or different things? Do those things feel useful? Why or why not?
  $\rightarrow$ Sum it up classwide.

- ► Interaction: Group work, 1 minute: At the moment, what would be the most helpful thing to help you (or others!) with Assignment 0?
  $\rightarrow$ Sum it up classwide, and try to address the findings.

TIEA311 - Agenda for Lecture 3 (16 January, 2019):

1. Discuss Assignment 0 (C++, git, handout, terminology, searching the WWW; **whatever was found out** in group **discussion**)

Have a **break**, at least for a few minutes, to clear the head.

2. Fundamental mathematics and terminology of computer graphics

Regarding math, we take (some) shortcuts and just "believe that the equations work", since this course is about an **application**, not theory itself. Yet we need **conceptual understanding** of the equations, too.

NOTE: While starting with the Assignments and linear algebra math, it is very important to **understand** as much as possible about the starter codes and especially about the included "vecmath" library! Really, the "vecmath" source is your true key to understanding how to program computer graphics.

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What were the findings in group discussion?

What were found to be the most important issues to address right now?

$\rightarrow$ Classwide discussion is found on the lecture video.

NOTE: Even if you watch at home, please think about the same things and try to be in "virtual dialogue" with those in classroom. Use pen and paper! I believe, more and more every day, that doing so will make your brain perform activities that help **your own learning**.

NOTE: Contemplate if you could watch the lecture videos with some friends who would also like to learn computer graphics? Get some pizza and coke if it helps you get to the mood(?).

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Then we went through the findings and also things that the teacher wanted to add to the mix (git, IDE usage).

$\rightarrow$ Live examples using Git Bash, Visual Studio 2017, and WWW are found on the lecture video.

Then we had a break at 60 minutes from lecture start.

NOTE: Even if you watch at home, please think about the same things and try to be in "virtual dialogue" with those in classroom. Use pen and paper! I believe, more and more every day, that doing all that will make your brain perform activities that help **your individual learning as well**.

NOTE: Contemplate if you could watch the lecture videos with some friends who would also like to learn computer graphics? Get some pizza and coke if it helps you get to the mood(?).

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Now we make sure that we can do high-school mathematics.
Otherwise there will be little hope of doing any university math.

How do we make sure we can? By witnessing ourselves do it,
of course!

$\rightarrow$ The teacher will give you some math problems to solve. On
a slide? No... **Of course using the powertools!**

$\rightarrow$ 1 minute solo work for each problem; after each, a
peer-evaluation in groups of 3 at most 1 minute or less if talk
ends; then all together make sure **everyone in class** has it
right, **on their own paper** to take home and hang on a wall.

(Notes for teacher: make 'em evaluate results after substituting numbers for
symbols in (1) polynomial evaluation, (2) additions and multiplications, (3)
solving of a 2nd degree equation looking at the formula from Wikipedia or
such. Make 'em also (4) symbolically differentiate a polynomial)

Discuss the exercise. → See lecture video. Make sure you end up with your own paper where you have written down the steps to arrive to the classroom-certified Correct Answers (TM) with your own hands.

Then we can move on to linear algebra theory and practice . . .

Plan for tomorrow:

► Finalize the exercise: only **one more problem** to solve and add to the paper to be hung on your wall.

► Then, a **sneak preview** or **teaser** of what is to be achieved: Real-world coordinates, points, "vectors", normals,
i.e., the main **objects** that we will be **modeling** in computer graphics.

► Then the major **mathematical tool** for modeling: **Matrices**