

# Games Engine Design

Course SS 2015

Rüdiger Westermann

Lehrstuhl für Computer Graphik und  
Visualisierung

- Lecture
  - Monday: 12:00 – 13:30, Interimshörsaal 2
  - Friday: 10:00 - 11:30, Interimshörsaal 2
- Announcements, slides, notes
  - <http://www.cg.in.tum.de/teaching/teaching/summer-term-15/game-engine-design.html>
  - Password for slides: ss2015
- Two written exams at the end of the semester
  - The first written exam will include the content of the lecture.
  - The second exam will include the content of the practical course.

- Focus on computer graphics algorithms & implementations
  - Scene modelling and representation
  - Rendering pipeline – from primitives to pixels
  - Texturing, shading and lighting
  - Graphics effects like shadows, reflections, particle effects
- Game engine programming
  - Time-based game loop
  - Motion and collision control
  - Implementation issues

- Development of a simple game
  - Write your own little game, including engine components
  - Learn how to program real-time graphics effects
- Focus on graphics programming using C++ & Direct3D
  - Graphics APIs and hardware support
  - Real-time graphics using graphics hardware
  - Shaders and effects
- In sync with lecture
  - First learn the algorithms
  - Then implement the algorithms using API, create media assets, and use in game

- Recommended books

Games:

- Gregory, *Game Engine Architecture*
- Akenine-Möller, Haines, Hoffman, *Real-time Rendering*
- Eberly, *3D Game Engine Design*

Graphics

- Foley, Van Dam, Feiner, Hughes: *Computer Graphics: Principles and Practice*, Addison-Wesley, 3rd edition
- Watt, Watt: *Computer Graphics*, Addison-Wesley
- Glassner: *Principles of digital image synthesis*, Morgan Kaufman

# GED Practical Course



There may be cake at the end of this course  
There may also be not!  
Who knows?

We're to blame for the programming exercises:



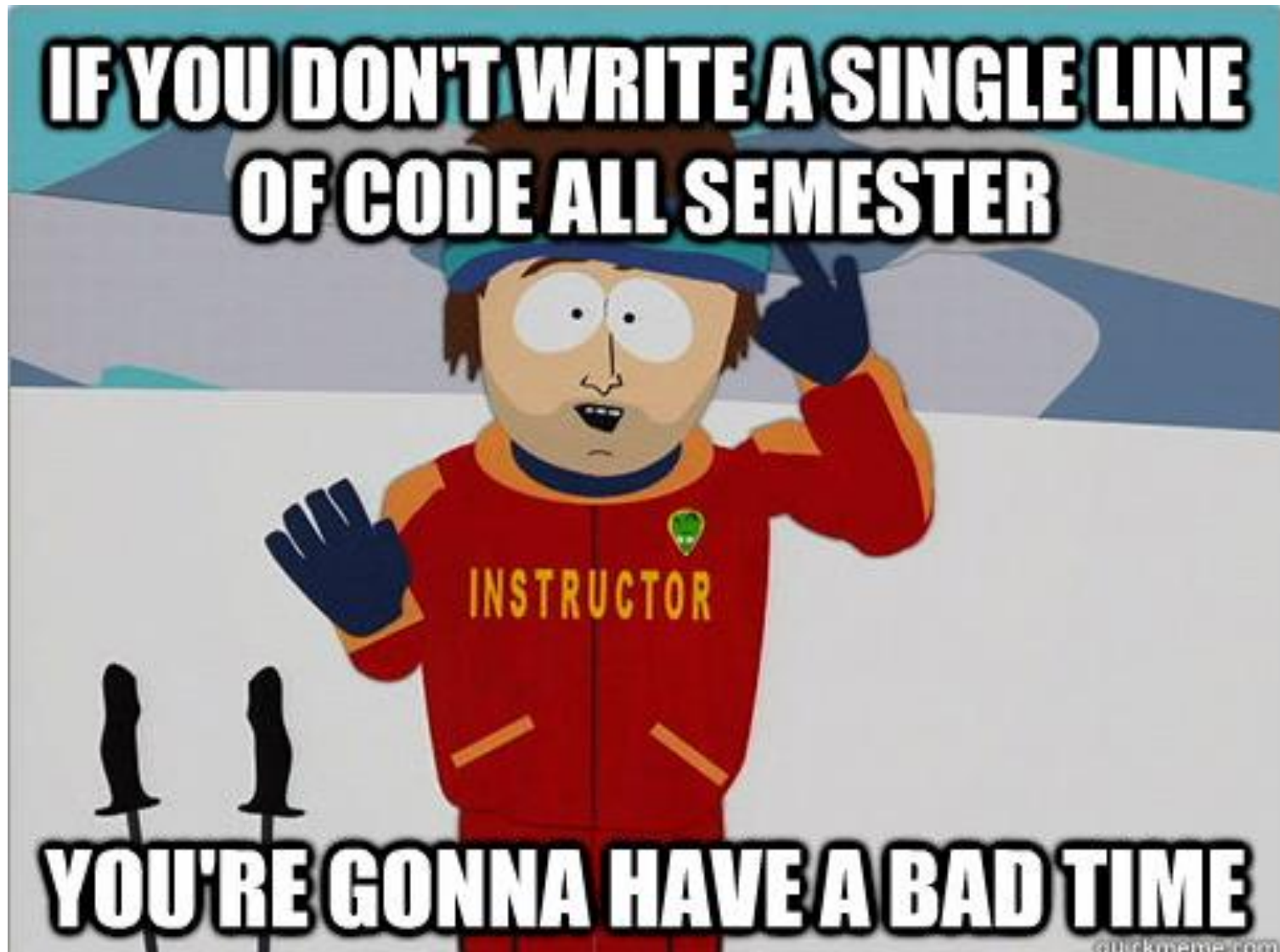
Mathias Kanzler



Ismail Demir

- One assignment each week
  - C++ and DirectX
- Final exam
  - You might also have to write some code in the exam...
  - ... and I guess your pen won't autocomplete your code





- 0.3 grade bonus on a **passed** exam
  - Score at least 60% of all points in the practical course
  - Score at least 30% of the points in **each** assignment
  - Demonstration of all members at the end of the semester
- Working in groups of 3 – 4 is **required**
  - Otherwise your homework will not be graded
  - Ask your tutor if you want to be assigned to a group
- Of course, you may (and should!) also share / discuss your ideas with others
  - But: Don't just copy & paste parts of the code of other groups!

- Assignments are handed in via SVN
  - **Deadline:** Each Friday before the lecture
  - The last uploaded version before 10:00 will be graded by your tutor
  - Inform your tutor if an older version should be graded!
- **Your code must compile**
  - Non-compiling solutions will not be graded!
  - Any assignments fixed / solved after the deadline will only reward you 75% of the possible score
    - Already obtained points will not be removed
  - Only up to 1 week of deferral!
    - 0 Points afterwards

- One assignment folder per student
  - Groups: Inform your tutor via e-mail about...
    - Group members
    - Which folder you will use
  - We will give the other group member access to the folder
- ReadMe.txt for anything the tutor needs to know
  - Hotkeys, known issues etc
- Keep your code clean
  - Easier to grade...



- Each Friday: Practical course lecture!
  - Assignment presentation
  - Theoretical basics for the assignments
  - Programming hints and examples
- Slides and assignments will be available a few days before

- There is a Q&A Forum!

<https://qage.in.tum.de/>

# Game Engine Design

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## Recent questions and answers

▲ ▼

0 votes

1 answer

Test question 12 chars  
answered 1 week ago by Anteru (230 points)

Help get things started by asking a question .

Welcome to Games Engineering  
Praktikum QA, where  
you can ask  
questions and  
receive answers from  
other members of  
the community.

Recent questions and answers

- Please post all questions to the Q&A forum!
  - Or ask your tutor directly, of course
  - Don't bombard us with emails...
- We & the tutors will try to answer your questions
  - Of course, other students can answer, too



- 10 tutoring groups of up to 20 slots each
  - Registration in TUMOnline open  
**Saturday, April 18th**  
**12:00 AM**
  - First come, first serve, no waiting list beyond these 20 slots!
- Group members: Register at the same tutoring group
  - Otherwise: Ask someone to switch
  - ... or ask your tutor if he can handle one more person
  - There's only 15 PCs though



- Tutoring groups will not be “lecture-style”
  - You can work on the assignments for yourself
  - The tutor will be present to answer questions
  - Don’t expect to get the whole assignment done in those 2 hours!
  - You may come to **any** tutoring group at any time and leave at any time
- Remember, remember: Detailed assignment explanation in the Friday lecture!

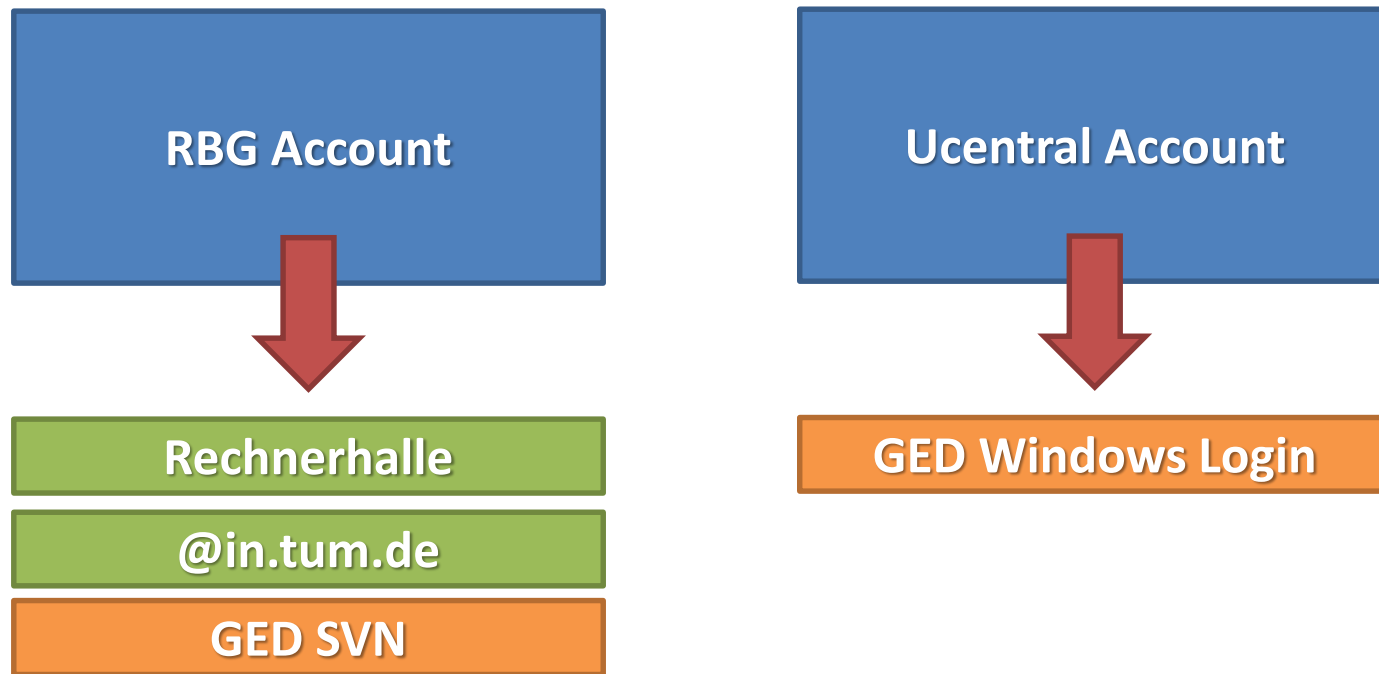
- Groups will start **Monday, April 20th!**
  - First week: „Preparation assignment“
  - First two assignments will not be graded
  - Which means „Do them on your own“ rather than „Don't do them at all“... you will need them!
- You will get your tutors email address in the first lesson
- In your group, everyone should know the code
  - You won't be able to add stuff later on otherwise
  - And you won't be able to answer the questions in the exam

- Three „GED“ rooms are available

Room	PCs
MI 02.13.008	15
MI 01.05.012	15
MI 01.10.020	10

- You will need specific accounts to access those PCs
- You can get your username and password from the User Central System by the RBG <https://ucentral.in.tum.de/>
  - Then use „Reset VDI Windows Password“
  - If you do not have an in.tum.de account, please contact the RBG Helpdesk.

- You have **two** accounts
  - Same username, should be the same passwords by default!



Group	Time	Room	Tutor
1	Mo, 14 – 16	MI 02.13.008	Kern
2	Mo, 14 – 16	MI 01.05.012	Brand
3	Di, 10 – 12	MI 02.13.008	Bernhardt
4	Di, 10 – 12	MI 01.05.012	Kern
5	Mi, 14 – 16	MI 02.13.008	Arjomand-Fard
6	Mi, 14 – 16	MI 01.05.012	Brand
7	Do, 12 – 14	MI 02.13.008	Arjomand-Fard
8	Do, 12 – 14	MI 01.05.012	Beckert
9	Do, 14 – 16	MI 02.13.008	Bernhardt
10	Do, 14 – 16	MI 01.05.012	Beckert

- Microsoft Visual Studio 2013  
<http://dreamspark.rbg.tum.de/>
- Microsoft Windows 8 SDK
- Subversion Client (TortoiseSVN, AnkhSVN)
- DX11-capable dedicated graphics card with Shader Model 4.0 (nVidia GeForce 8+, ATI HD)

## Questions?

(yes, these slides will be online)