

# Dive into Mobile VR/AR Games

Pre-Meeting  
Practical Course  
SS 2015

24th March, 2015

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Dive into Mobile VR/AR Games  
Practical Course SS 2015  
Computer Graphics and Multimedia



**RWTH**AACHEN  
UNIVERSITY

# Meeting Outline

1. Course Goal
2. Organizational stuff
3. Important Dates
4. Intro to VR/AR
5. Introducing Dive
6. Tasks per Team
7. Tasks Samples
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9. Teaming Up
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11. Kick-Off Meeting
12. Semester Time Table

**We aim from this course that participants will gain experience in:**

developing computer graphics applications.

VR/AR basic concepts.

mobile application development.

software engineering techniques.

being a team player.

# Organizational Stuff

## Course Credits

- 6 Credits for Bs. Inf.
- 7 Credits for M.Sc. Inf.
- 10 Credits for M.Sc. Media Inf.

## Participants:

- 24 Bs. Inf.
- 8 M.Sc. Inf.
- 7 M.Sc. Media Inf.

## Teams:

- 4 groups for Bs. Inf. (6 in each team)
- 3 groups for M.Sc. (5 in each team) (Including the Special Missions team)

Each team will have three main sub-teams for different topics (Graphics, Game Logic, Content Creation)

# Important Dates

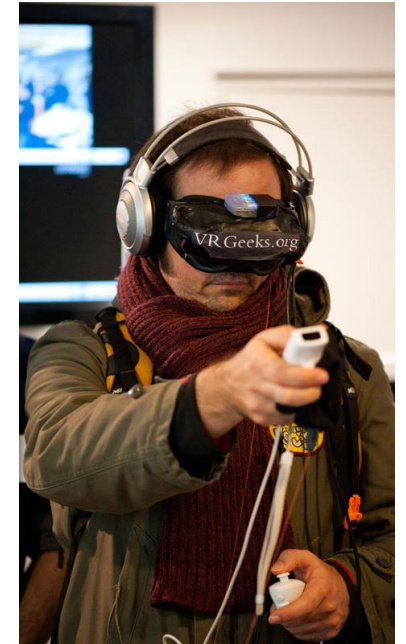
On **14.04.2015**  
we will register all the participants to ZPA.

Before this date, everyone can quit this practical course without any negative consequence.

(E-Mail to: Li & Middelberg) Li, Ming: [mingli@cs.rwth-aachen.de](mailto:mingli@cs.rwth-aachen.de), Middelberg, Sven: [middleberg@cs.rwth-aachen.de](mailto:middleberg@cs.rwth-aachen.de)

<b>Tech-Info Meeting:</b>	<b>31.03.2015 at 14:00</b>
<b>Kick-off Meeting:</b>	<b>14.04.2015 at 14:00</b>

# Virtual Reality



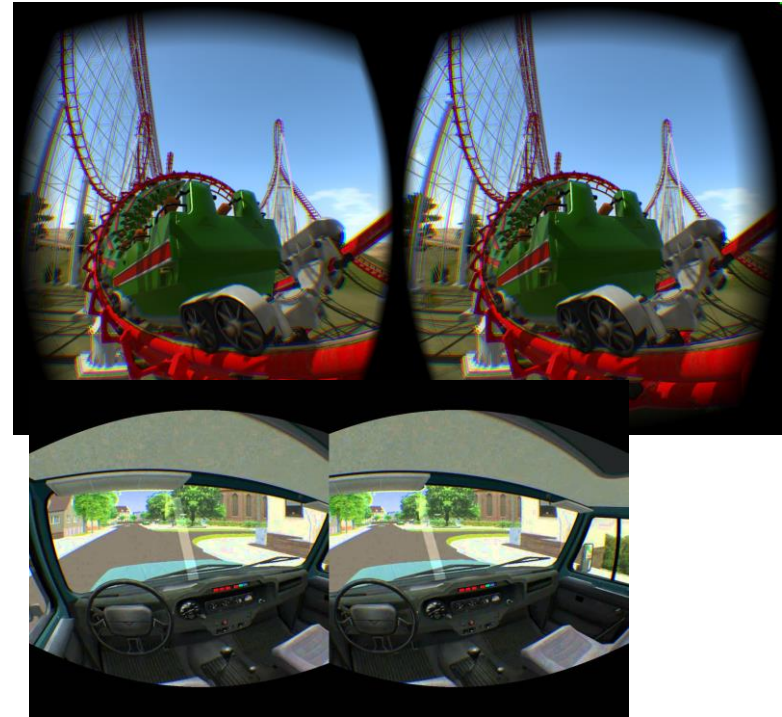
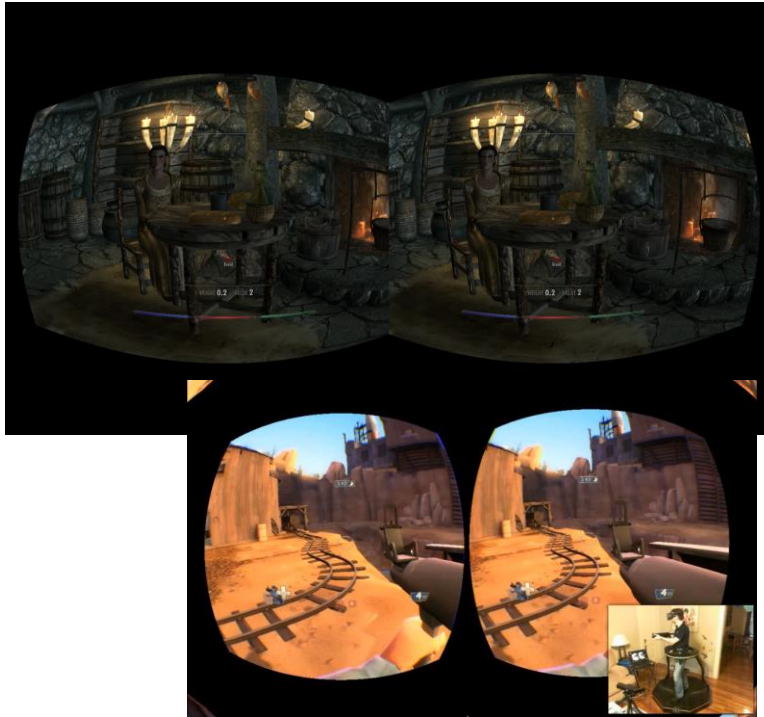
# Virtual Reality

## Virtual reality head-mounted display



# Virtual Reality

- Split-view of the screen.





# Mobile Augmented Reality



# Mobile Augmented Reality

Tracking as a basic functionality in any AR app



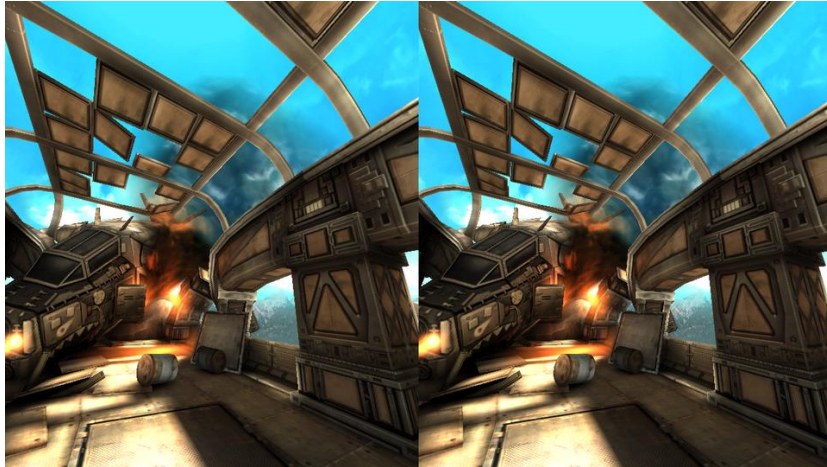
# Dive

- From Durovis
- Using a mobile device as a mounted display where the scene is rendered.



# Results Samples

- On dive site, many existing samples and games, try them out!
- We will try to build something similar.



A screenshot of the divegames website. The header includes navigation links for Home, Games, and About, and the divegames logo. The main content area is titled "Games" and describes the site as a source for Dive Games. Below this, there is a section titled "Games by divegames" which displays a grid of game cards. Each card shows a game icon, a "GET IT ON" button with the Google Play or iTunes logo, and the game title and developer name. The games shown are Bubblecars, Dive City Rollercoaster, Dive Launcher, Dive Wings, and The Height. The Dive Launcher card also features the "dive by DUROVIS" logo.

# Tasks per Team

- **Game Login**

Game concept, interaction techniques such as: collision detection, ray-casting, hand recognition, remote control. Using different SDKs such as: OpenCV, etc...

- **Content Creation**

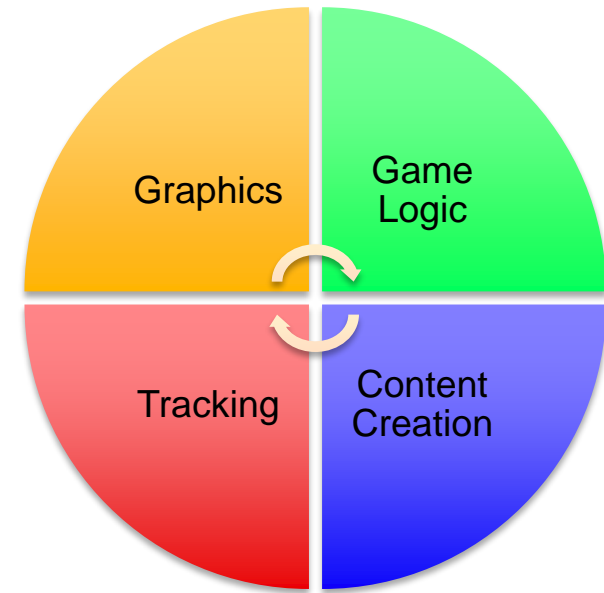
Creating objects using Blender, implementing procedural texture, using texture databases such as CG-Texture, modifying triangle meshes generated using SfM, etc...

- **Graphics**

Deal with different concepts such as: Phong shading, Normal-Mapping, Cel shading, shadows, Screen space ambient occlusion (SSAO), Motion blur, Glow (Bloom), texture animation, etc...

- **Tracking & Others**

Mobile interface, AR split-view calibration, etc...



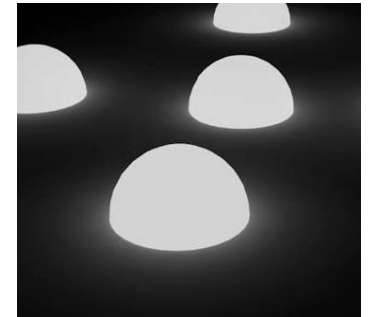
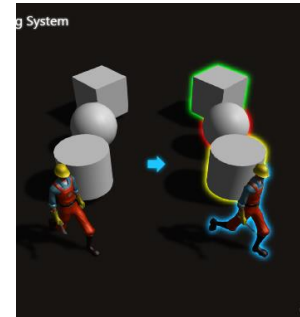
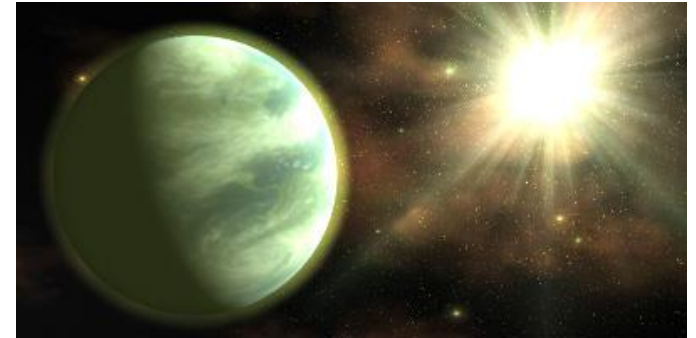
# Graphics - Shading

Shading: e.g. Phong shading, Cel shading, etc...  
Texture Animation



# Graphics – Post Processing

Post Processing: e.g. Glow



# Graphics – Post Processing

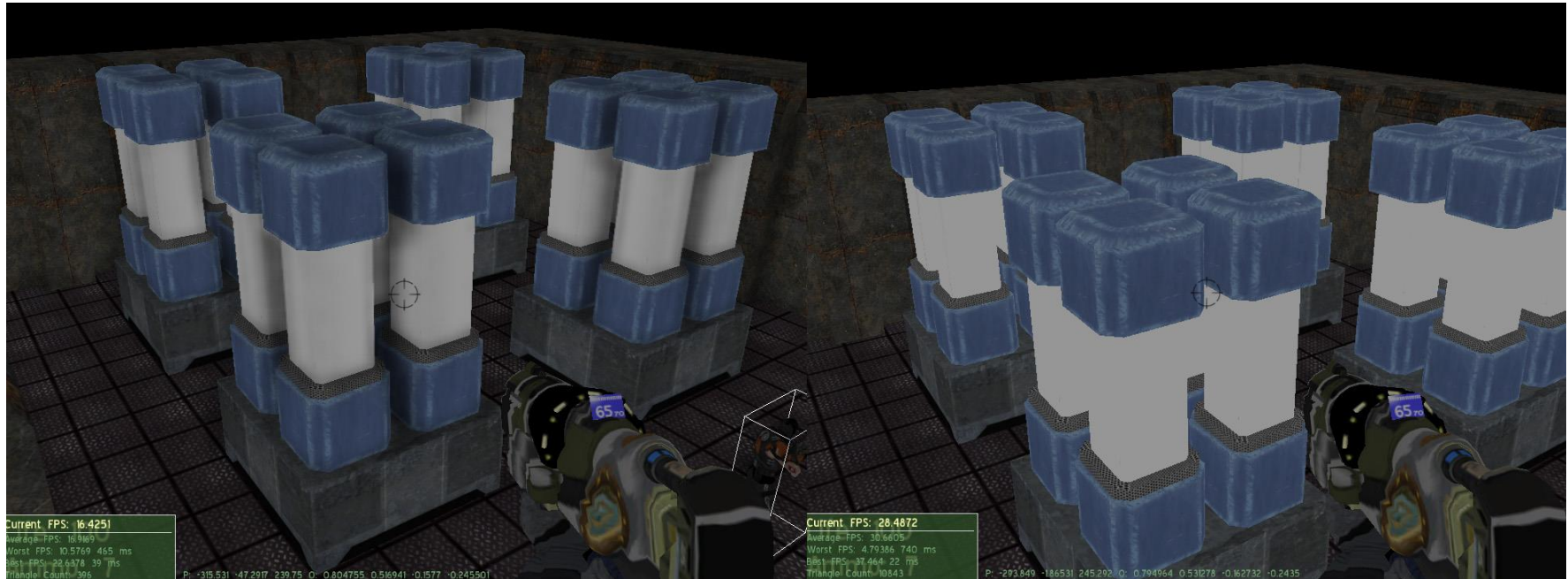
Post Processing: e.g. Motion blur





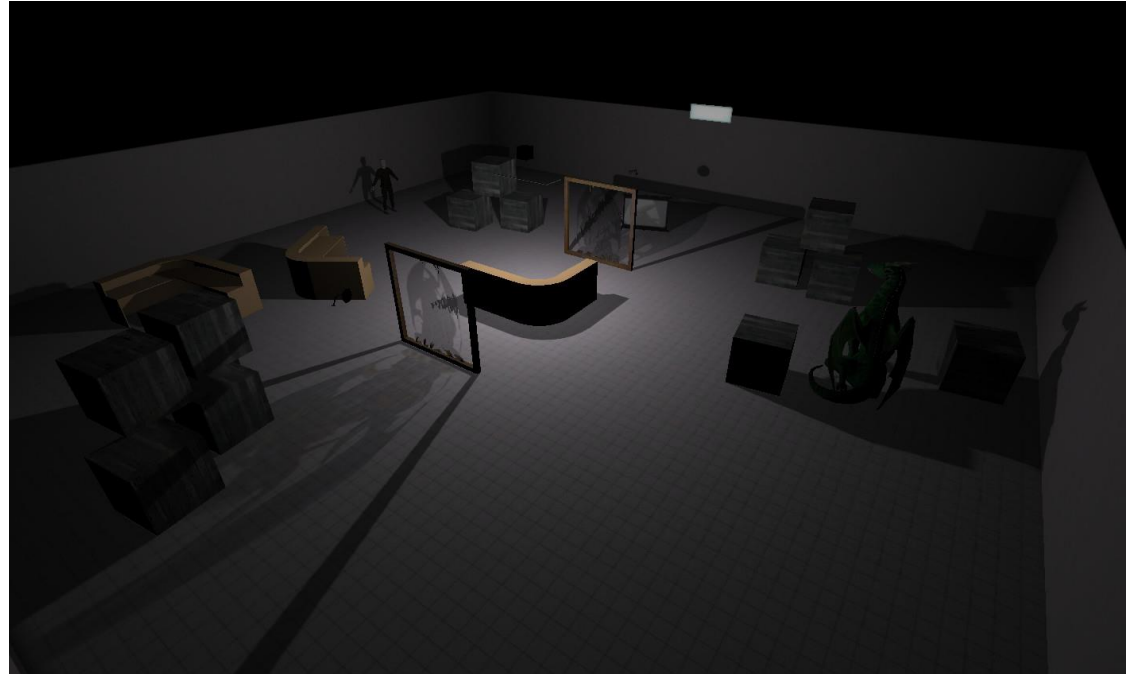
# Graphics – Post Processing

Post Processing: e.g. SSAO (Screen space ambient occlusion)



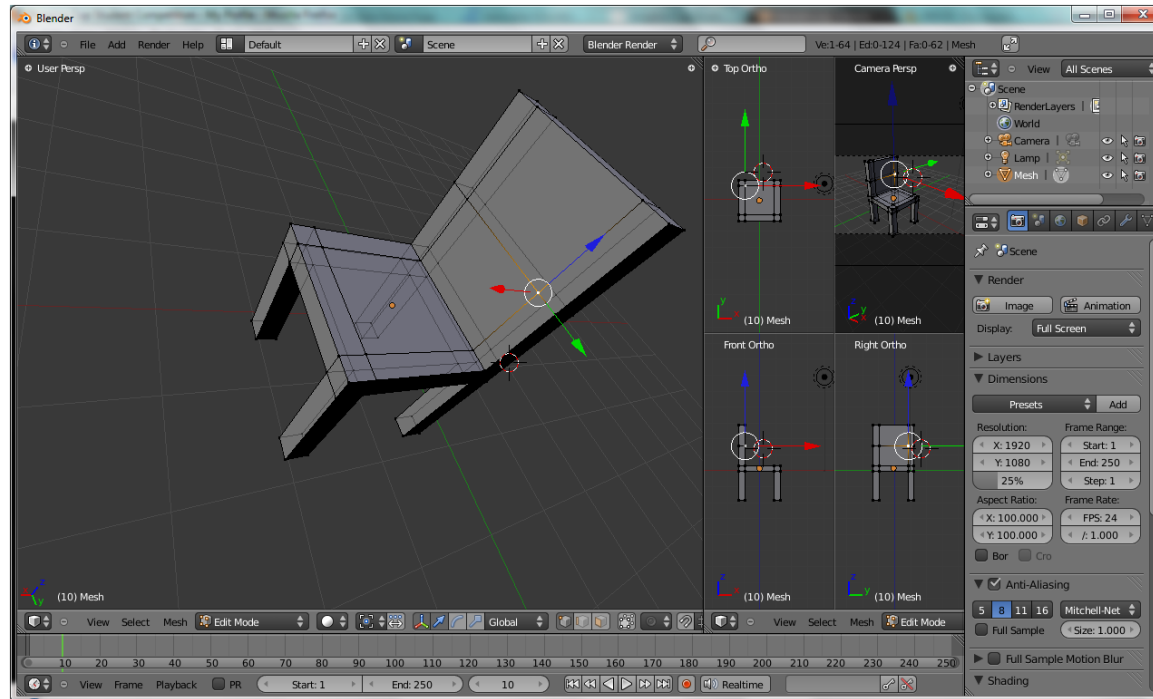
# Graphics – Multipass Effects

Multipass Effects (e.g. Shadow Mapping)



# Content Creation

Using Blender for creating the application assets (i.e. Geometries, Textures)



# Game Scenario

## Each team will develop their own game scenario

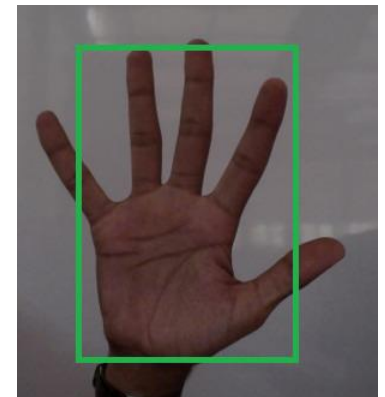
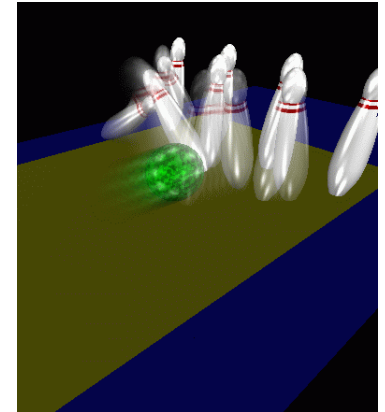
- Virtual Reality Games **or** Augmented Reality Games

Depending on the scenario

- AR: Using of the Localization framework we provide
- VR: Using of different localization methods (e.g. mobile sensors)
- Possibility for multi-players scenarios

## Interaction (as an example):

- Basic physics: e.g. gravity, collision detection.
- Triggered events
- Multiplayers
- Basic Hand recognition
- Remote Control



# Used Technologies

## Developing for mobile phones with iOS



Xcode

## Handling Graphics:

- OpenGL ES 2.0 / 3.0

## Creating Content:

- Blender (etc ...)

## Source Control:

- git

## Used Devices:

- Dive, etc...



**Find yourself a team**

**Sign NDA**

**Get your account** (Later on)

# Important dates: Tech-Intro Meeting

## Tech-Intro Meeting

**Save the date**  
**31.03.2015**  
**14:00 – 15:00**

It will be about:

- An Introduction to Computer Graphics
- An Introduction of Project Management: Git
- Showing few working basic sample applications
- A brief theory about the localization framework

# Important dates: Kick-Off Meeting

## Kick-Off Meeting

**Save the date**

**14.04.2015**

**14:00 – 15:00**

Your first task.

Each team will present their:

- App/Game Idea
- Design Proposal:
  - Theme (including Sketches)
  - Effects (Graphics & Physics)
- Work Distribution
- Milestones / Plans



# Timeline

## Beginning of SS15

Kick off meeting

Presenting your idea and first draft (Sketch)

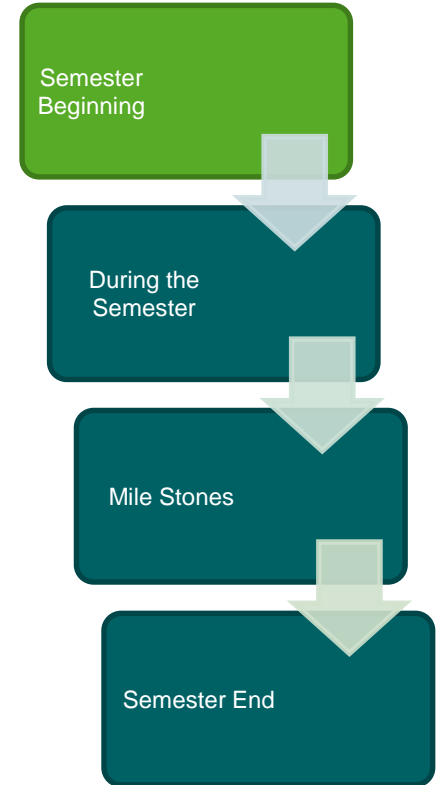
Application Specification:

Class Diagrams

Rendering Pipeline

Game Logic Integration

Scene File Format



# Timeline

## During the semester

Coding

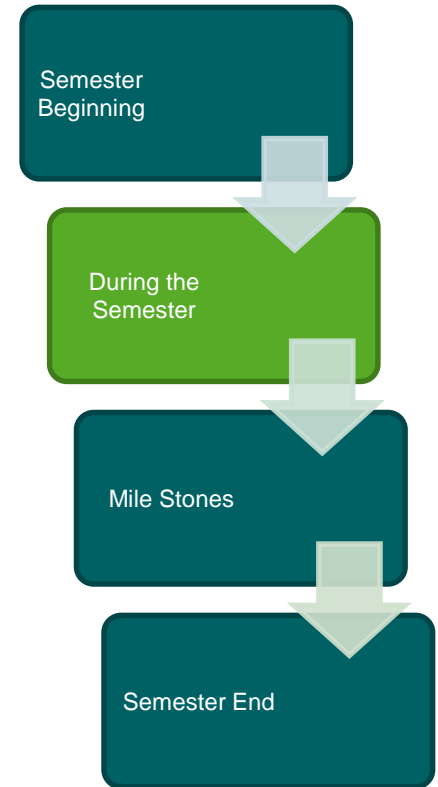
Communication between groups

Integration & Testing

Present your progress in each milestone meeting

Progress report via e-mail (bi-weekly!)

Optional: Individual meetings (appointment)



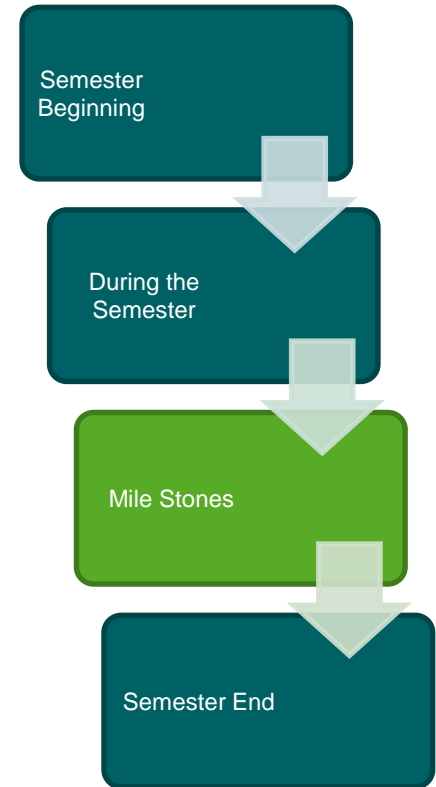
# Timeline

## Milestone Meetings

3 milestones meetings during the semester

At each:  
teams present their progress

Dates will be announced on the kick-off meeting



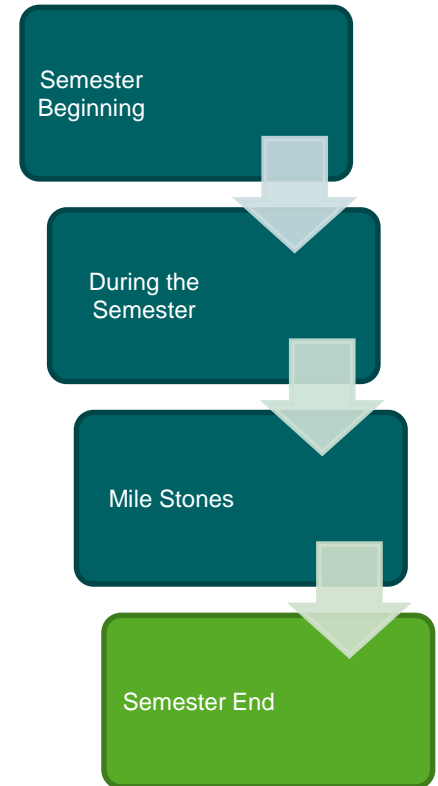
# Timeline

## End of semester

Final Software (End of Semester, TBA)

Presentation and Demo (Templates and Instructions will be provided)

Report and Video



# Available Resources



5 Devices



7 Different  
devices



Enough

**So far, that was all from our side**

**Any Questions?**