# Home & Building Automation

Lecture 1
Introduction

whoami

- http://ulno.net, Ulrich Norbisrath
  email: replace http:// with ulno@

- **Adjunct Professor**
    - George Mason University
    - FH Upper Austria

- **Independent IoT Consultant/ Inventor**

- **PhD** from RWTH Aachen University:
  "Configuring eHome Systems"

- **Research:** Internet of Things, Story Driven Modeling, search support

- **Teaching:** H&B Automation, SE, Systems

- **International teaching and research experience:** USA, Germany, Austria, Estonia, Kazakhstan, Singapore, Indonesia
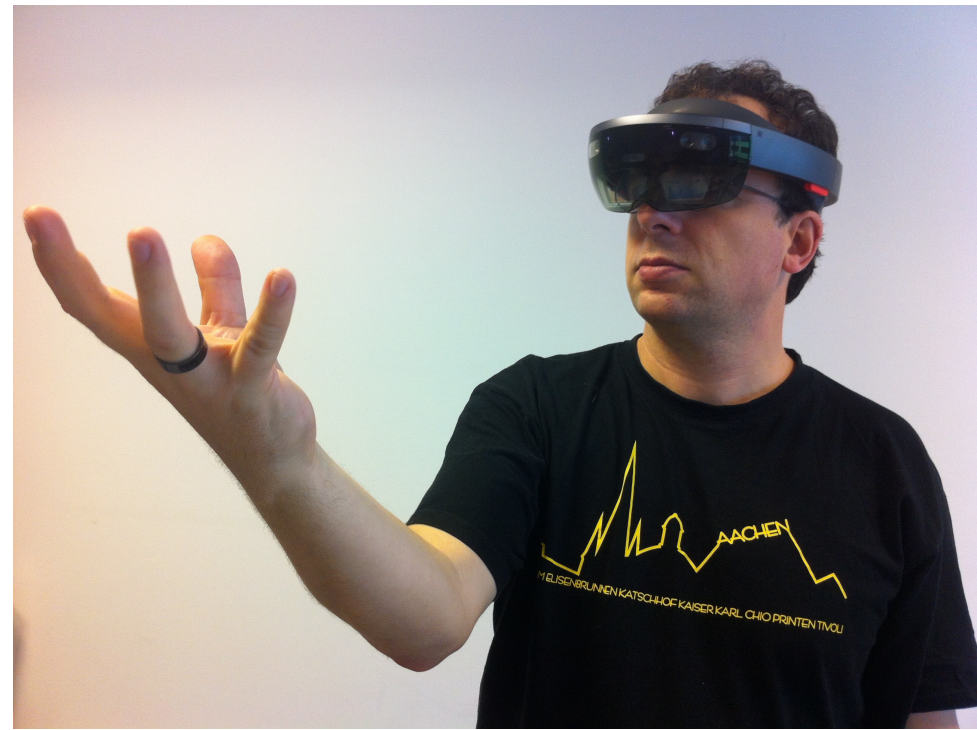
Who are you?

- 5 min, write down something about the following (this needs later to be checked in in beginning of your portfolio):
  - Who are you, why are you studying Mobile Computing/Energy Informatics?
  - What do you expect from H&B Automation?
  - If you were in a team of 4 persons what would you bring to the table (strength and weaknesses)?
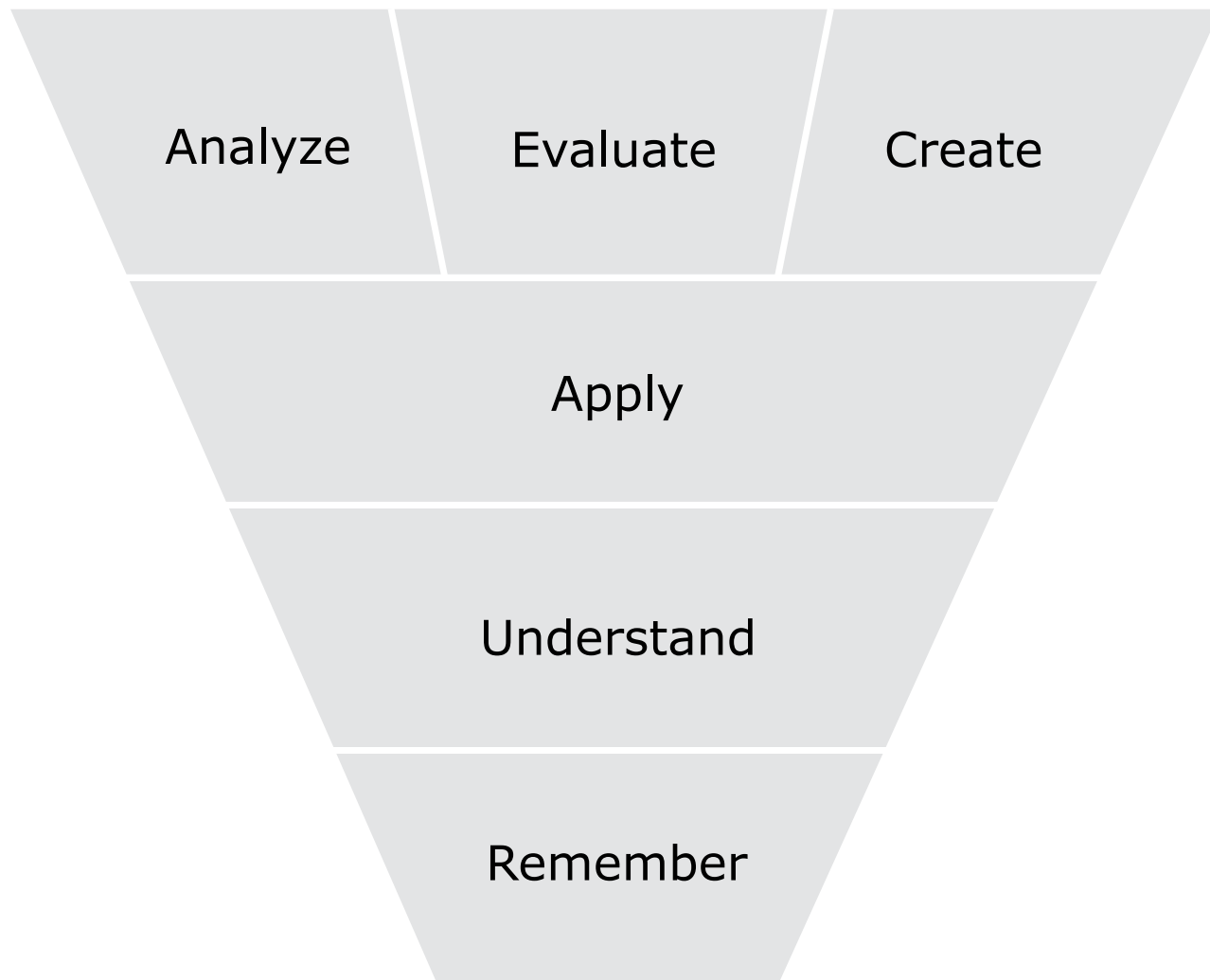- Present first two.

Syllabus

I don't lecture!

But this is a lecture...

- … and you are lecturing right now!
- OK, sometimes, but …

- How do you learn best?
- You know Bloom's Taxonomy of Learning?

Blooms Taxonomy of Learning

https://upload.wikimedia.org/wikipedia/commons/9/9e/BloomsCognitiveDomain.svg

There is a page in the Internet...

Show Time – 2 Movies

To enable discussion afterwards make keywords regarding the following topics (also → portfolio + notes from discussion)

- scenarios and application domains

- technologies

- feasibility
  - what might be doable?
  - what not?
  - when?

- weirdness/crazyness (any concerns?)

  https://www.youtube.com/watch?v=EgDIYuBKXVY
  https://www.youtube.com/watch?v=gCuPx9shWT0

- (bonus feature: Internet of Shrimps)

Where is the killer app?

ssh

- If you don't know, read up and learn - expected here.

- Especially key-exchange.

Version Management - git

- No binaries or dependencies into git.

- Use Kanban-like project management.

- Create repository (one per team is enough) on github, bitbucket,or gitlab

- Creator give access to team members

- Check in often – learn to branch

- Consider forking ulnoiot (in seperate repository)

Team Building

- 4 per team, if not possible 1-3 teams with 3
- Create team name (Suggestion for name: merged initials)
- Create git repository
- Create subfolder for member and check in discussion notes
- Create personal portfolio start-pages in markdown or restructured text – add previous description and discussion notes
- Share contacts
- Allocate meeting time in week (approx 2 full days per week)
- Define how team is managed (what if someone falls behind)

Project 1: Debate

- Goal: lead debate
- Topic: **Everybody should automate their home! True or False?**
- Teams: 2 pro, 2 con, moderator
- Two persons for con present in the discussion panel, two for pro
- One minute statement per panel presenter what your team stands for (has to be presented by one, time is strict 60-120 secs).
- Public discussion points need to be finalized tomorrow night.
- All material (resources/references) you find has to be made public
- The whole preparation has to be managed with tasks (Kanban)
- Small 15 minute practice discussion (needs to be recorded and published on youtube)

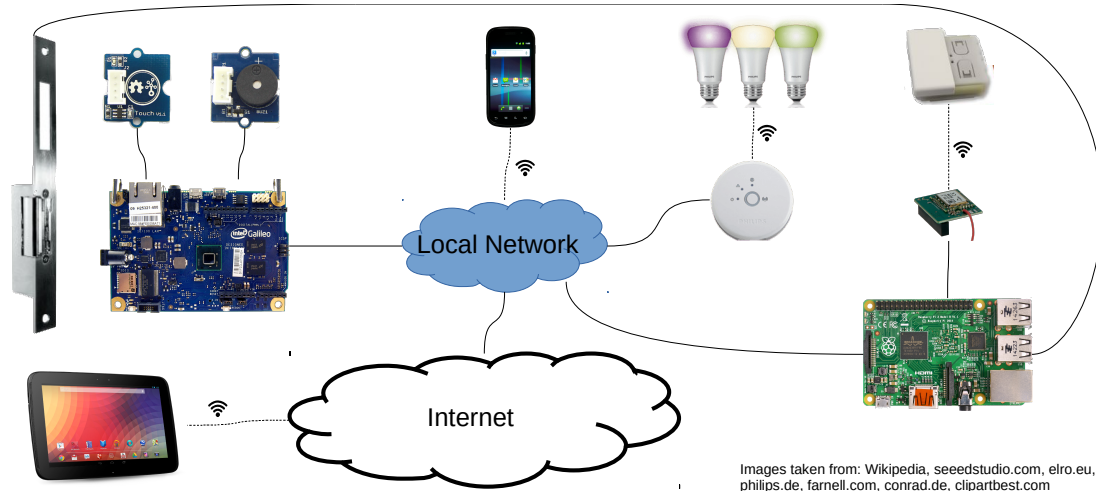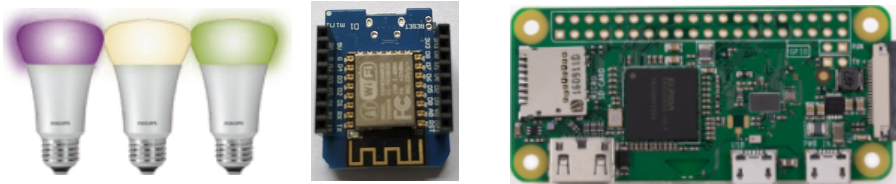# Internet of Things (IoT)

- What does the Internet of Things entail?
- Use phone or laptop to google about IoT, find and note down:
    - 3 domains (included areas)
    - 2 typical devices (appliance or controller)
- 3 minutes time
- discussion

Internet of Things (IoT)

- **IoT Domains**
  - Ubiquitous Computing (Pervasive Computing)
  - Home automation
  - Urban Computing/Smart Cities
  - Embedded Computing
  - Actor/Sensor Networks
  - M2M Communication
  - Mobile Computing, Wearable Computing
  - (Hacking/Making)
  - Big/Actionable Data
  - →**Systems, Connectivity, Data**
- **Devices and controllers**

Images taken from: Wikipedia, seeedstudio.com, elro.eu, philips.de, farnell.com, conrad.de, clipartbest.com

Hello World of IoT and H&B Automation Let's Switch on a Light

- Small discussion in team how you will share information

- Raspberry Pi UlnoIoT gateway (do an ulnoiot upgrade!)

- Make pw-less ssh work on pi

- Add team git repository on pi

- Switch led on one Wemos D1 Mini with sending mqtt command on pi

- Use button to switch led

- Challenge: use display (old fashioned hello world!)

- Document/log:
    - Follow along and take notes when I demonstrate and while you experiment
    - Replicate and note down poblems and challenges
    - Help neighbor(s), note down help you give and receive
    - Consider having a team log (so work on two logs at the same time or have one dedicted person working on team-log, or curate your own later)