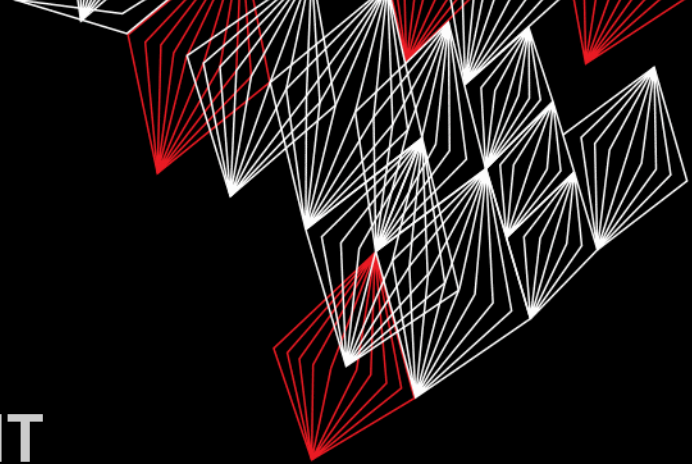


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# APPLICATION DEVELOPMENT

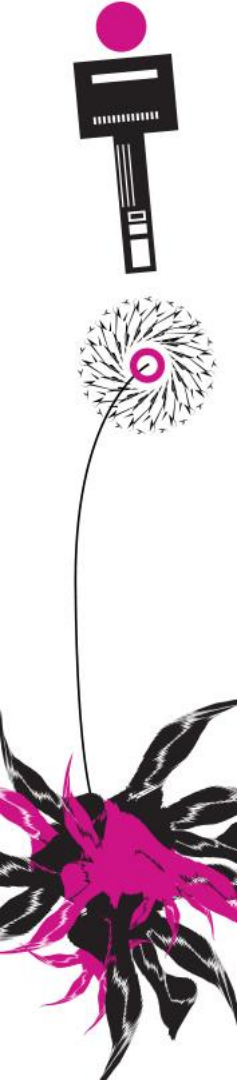
LECTURE 7: ANIMATION, TIMERS & COMMUNICATION

```
class AppDev {
```



Part of **SmartProducts**

```
}
```



# INTRODUCTION

## APPLICATION DEVELOPMENT

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- Animation, timers
- Communication
- Assignment

Fjodor van Slooten  
W241 (*Horst-wing West*)  
f.vanslooten@utwente.nl



Next week: practice exam

# TIMER

Used in today's assignment

- Executes method every clock tick
- Animation: Use timer to draw something while changing its position

```
import javax.swing.Timer;

// Declaration
Timer t;

// Initialization:
// timer ticks every 500 ms (=0,5 sec.)
timer = new Timer(500, (e) -> update() );
timer.start();
```

Method *update()* is called every clock tick

Example: [catch-the-ball game](#), [atm-tutorial](#), assignment 4b, 7

VENTE.



# TIMER

```
public class DrawingPanel extends JPanel {  
  
    private Timer t;  
  
    public DrawingPanel() {  
        // initialize timer:  
        // repaint all elements at each clocktick:  
        t = new Timer(20, (e) -> repaint() );  
        t.start();  
    }  
  
    protected void paintComponent(Graphics g) {  
        for (DrawingObject o : gameElements) { // for each element...  
            o.paintComponent(g)  
        }  
    }  
  
    public void stop() {  
        timer.stop();  
    }  
}
```

Timer starts immediately

Call *repaint()* method at every clock tick

Method to stop timer

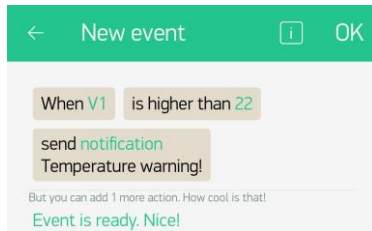
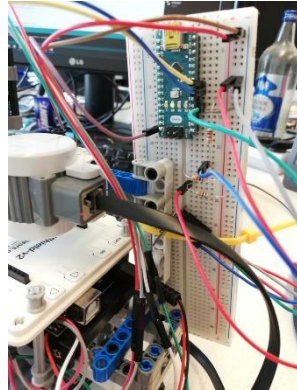


# COMMUNICATION

## PREVIOUS EXAMPLES

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- Weather station app (assignment 3): get temperature data from a connected Arduino (details how to setup communication: appendix of assignment 3)
- Remote control Explorer robot with phone (Blynk App): [practical assignment 2](#)
- More examples of communication: [practical assignment 3](#) & [Blog posts](#)

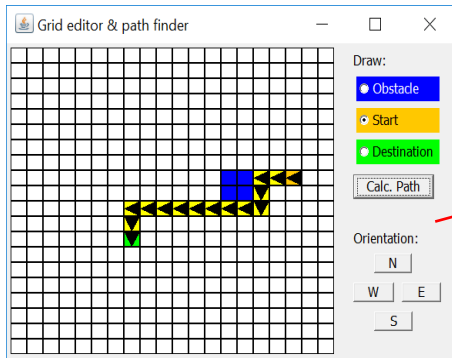


# COMMUNICATION

## IN TODAY'S ASSIGNMENT

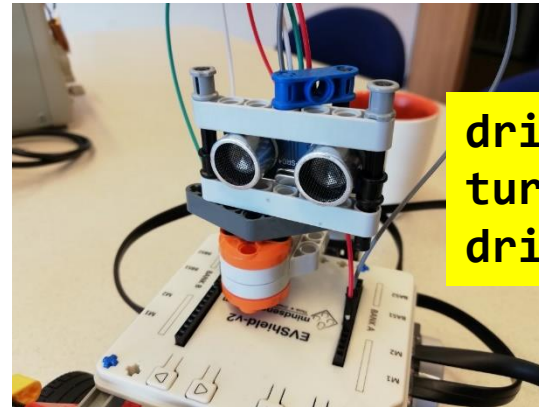
- Complete detailed example of how to communicate via Serial Connection in Appendix of assignment 7

Generate driving instructions and send them to Explorer robot



d180t90d240

Acknowledge



```
drive(180);  
turn(90);  
drive(240);
```

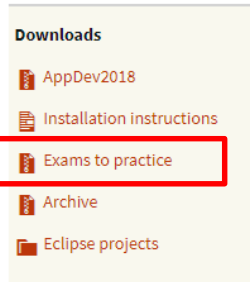
# PRACTICE EXAM

Exam: Monday  
July 2th 8:45

Location to be  
announced (in  
schedule and  
rooster)

- 2 full exams of last year with answers:

downloads @ [vanslooten.com/appdev](https://vanslooten.com/appdev)



Next week: practice exam, with some examples of Arduino-related/C++ questions

# REPORT

## HAND-IN SOFTWARE

Deadline report  
Juni 22th 23:59

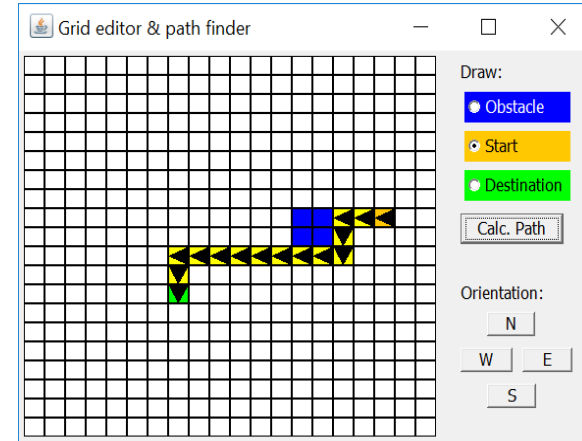
- In report:
  - Design of software (class design, pseudo code, charts)
    - Eg. class-diagrams/UML
    - Eg. flow-charts
  - Design rationale: why...? did you use/program/make software in this way? What would be different in real product?
- Appendix (digital, as part of zip-file):
  - Source code of all software (Arduino/C++; Eclipse)
  - Source code must be documented by using comments as you learned
  - Document external parts (used from online sources/libraries etc.)

[How to hand-in as zip-file is explained here](#)



# ASSIGNMENT #7

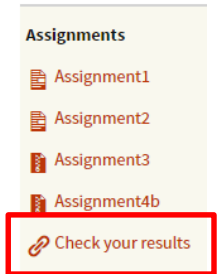
- “Expand the interactive map editor with path-finding capabilities”:
  - Include orientation
  - Generate driving instructions
  - Animate the path



- **Next week:** practice exam + assistance with assignment available in the morning
- Details about exam, **hand-in of Lego kit** etc. are in [schedule](#).



Check assignments results:



This afternoon: **projects questions get priority**, questions about assignments or checks might not be possible!