Programming: The Next Step

Us

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You

Research master psychology / behavioural data science / cognition in society

English / Dutch

Prior programming experience

Motivation

Course

Refresh and improve your programming skills while independently developing a software program, over the course of four weeks.

What to expect from course

Write a software program from start to finish

Document your software

Present your software and plans along the way

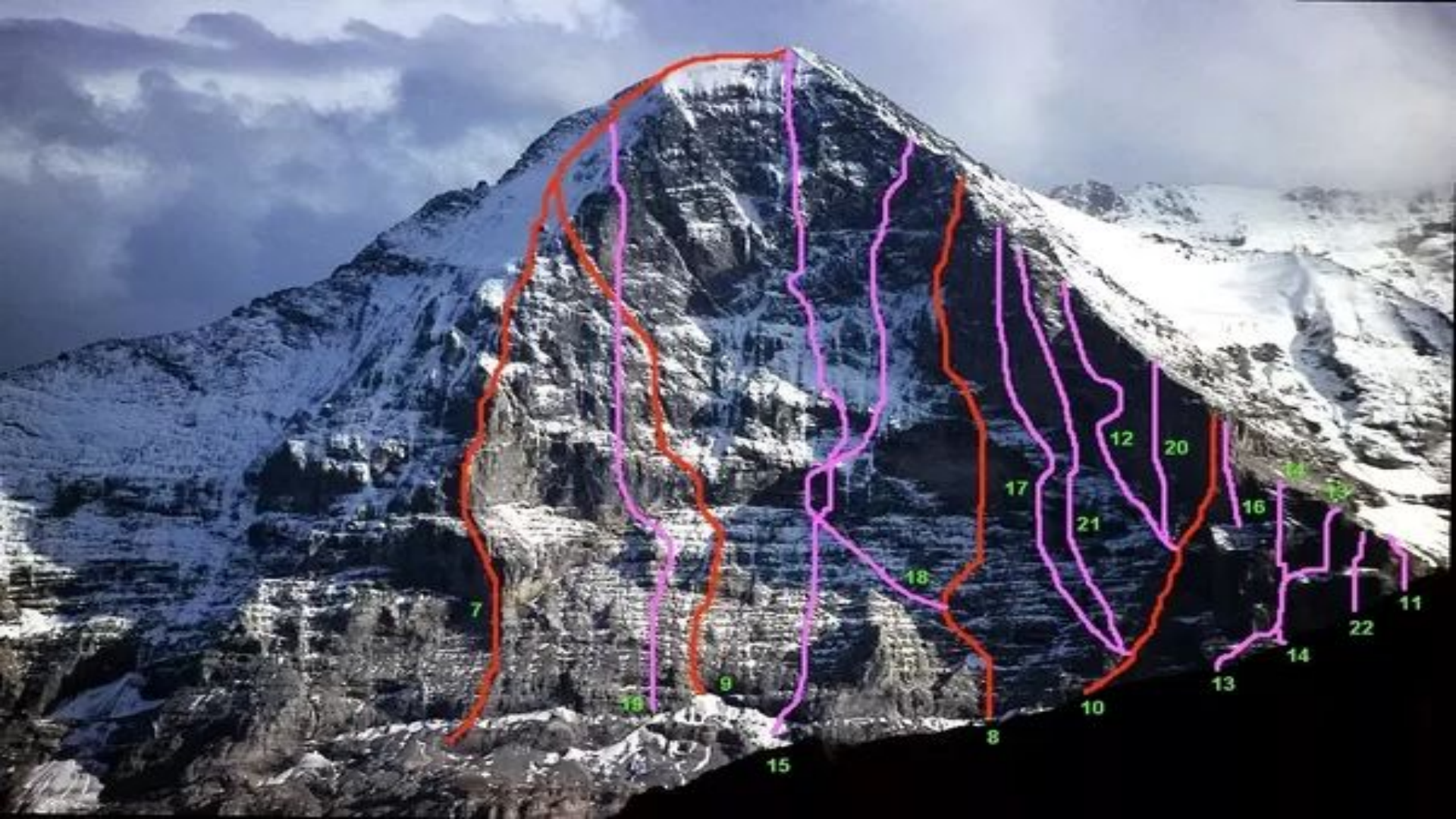
Workload of 21 hours per week

What to expect from us

2 hours of personal supervision

Programming superpower tips

No language instruction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Languages

R + Shiny: statistical computing + interactive web applications

Presentation + Mobile: experimentation

MATLAB: numerical computing

Python: general purpose

JavaScript: web programming

C: general purpose

NetLogo: multi-agent modeling (tutorial)

…

Topics: simulation & statistical software

Stable marriage problem / college admission problem (Gale & Shapley, 1962)
Elo algorithm simulation (Klinkenberg et al., 2011)
Regression (tree) boosting (Rojas, 2009)
Boltzmann machine simulation
Suggested: R + Shiny, Python

Pólya's urn model simulation
Suggested: R + Shiny, Python, NetLogo

Network model of intelligence simulation (van der Maas et al., 2017)
Suggested: NetLogo

Topics: experimentation software

Visual search task ...
Simon task ...
Flanker task ...
Sternberg task ...
Attentional blink task ...
Balloon analogue risk task ...
Random dot motion task ...
Wisconsin card sorting task …
… with e.g., task switching, adaptivity, gamification, AI opponent
Suggested: Presentation, Python

Topics

Propose your own topic

Make sure:

- you haven’t worked on it before / it’s not part of different graded project
- it can be done in 4 half-time weeks: make it scalable
- you’ll create experimentation/simulation/statistical software

Schedule

	In class	At home
Tu 1	-	Language and topic selection, concept design
Tu 8	Present concept design (3m)	Implementation, update presentation
Tu 15	Present implementation (2m)	Implementation, update presentation
Tu 22	Present status and verification (2m)	Final report / manual
Th 31	Final presentation (5m)	-

Time 11:00-13:00; location G2.01

Slides on www.alexandersavi.nl/teaching/

Grading

60% software

- Functionality
- Coding style
- Within code documentation
- Version control
- Testing (verification) procedure

20% documentation

- Manual incl. task/technique description (requirements), flowchart of design, how-to for users

20% presentation & discussion

- Final 5-minute presentation
- Active participation during discussions: everyone benefits from questions and tips

NB. *Your chosen topics will not be equally difficult, so effort will too be taken into account.*

This Week: Concept Design

Concept: User Perspective

1. Narrative / description

- Describe in plain words who will be using it, how, and for what.

2. Graphical interface

- Draw an impression of the user interface.

3. Flowchart

- Create a flowchart of the options and actions of the user.

Concept: Software Perspective

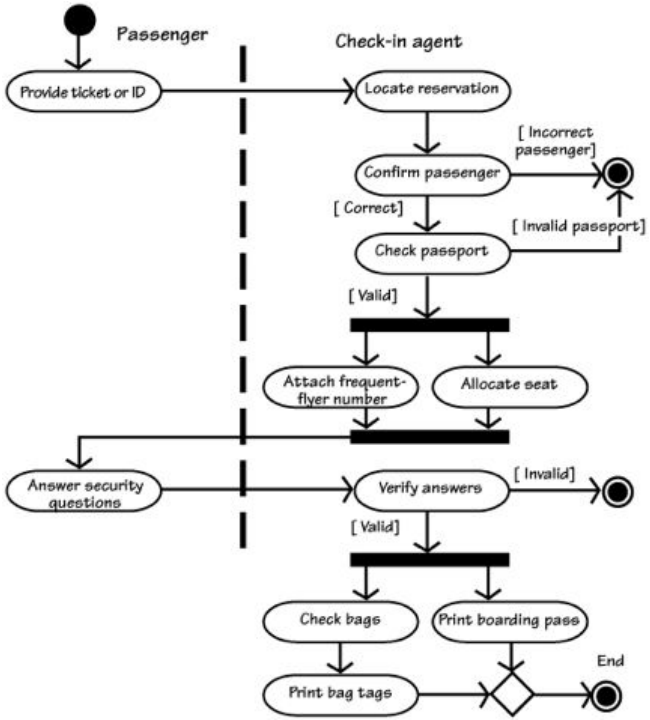
4. Flowchart

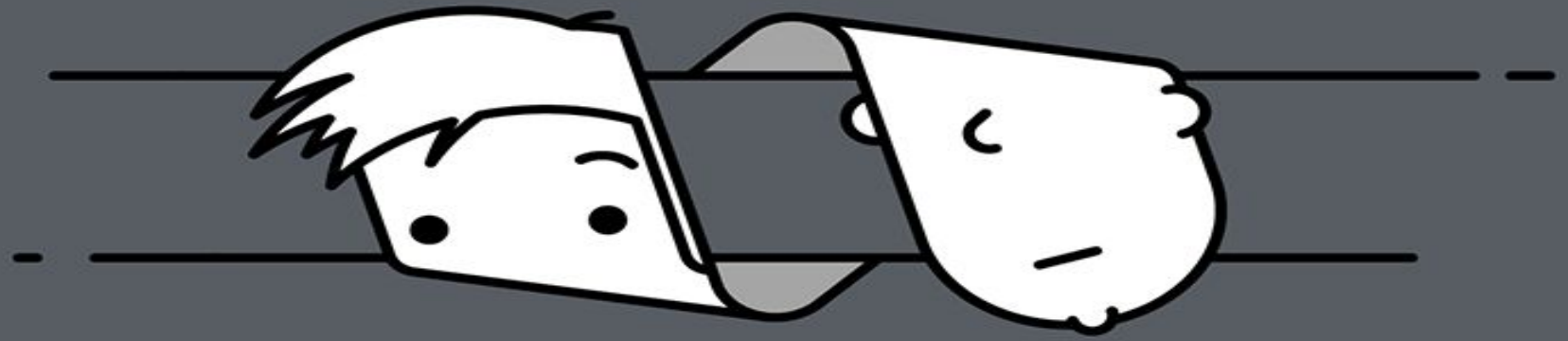
- Create a flowchart of the input, output, and internal functions of the program.

5. Pseudocode / Structured English

- Write the main functions in plain, structured language.

```
IF customer has a Bank Account THEN
   IF Customer has no dues from previous account THEN
      Allow loan facility
   ELSE
      IF Management Approval is obtained THEN
         Allow loan facility
      ELSE
         Reject
      ENDIF
   ENDIF
ELSE
   Reject
ENDIF
EXIT
```





"LET ME WRAP MY HEAD AROUND IT..."

Presentation

Create with Google Slides

Use 4 slides:

1. title page with your name, topic, language, supervisor
2. user perspective (minimal version)
3. software perspective (minimal version)
4. possible extensions / features

Share with o.a.savi@gmail.com

Present next week in 3 minutes

Prepare: Version Control

Sign up for GitHub

Apply for unlimited private repositories (student email required)

Install GitHub Desktop (Linux users try pre-release version)

Already familiar with Git and using it? You can skip this!

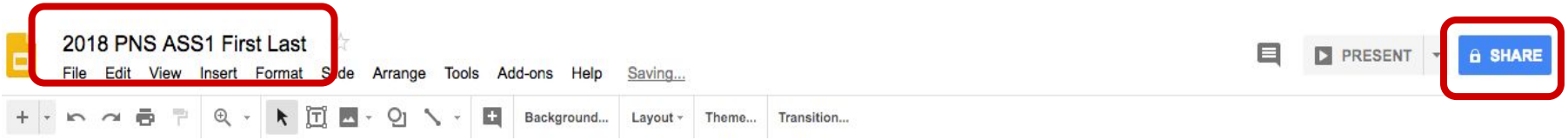
Deadlines

Choose topic and language: Thursday, May 3, 17:00

- https://goo.gl/forms/V86SgOfX6KCdZgWH2

Share presentation: Tuesday, May 8, 9:00

- Name it, share it



Be prepared for GitHub use: Tuesday, May 8, 11:00

Comments / feedback

We're here to facilitate your learning experience

Any comments or feedback?

Tell us during the course

You can do so anonymously on www.alexandersavi.nl/teaching/

Questions?

Happy designing!