SNU College of Engineering

Summer University 2016

with the University of Applied Sciences and Arts, Western Switzerland

Student Orientation, April 22, 2016

CoE – HEIG-Vd Summer University Program

- bilateral program between the Dept. of Computer Science and Engineering and the University of Applied Sciences and Arts, Western Switzerland (HEIG-Vd)

- location alternates between the two countries
  (2016 – Switzerland, 2017 – Korea, 2018 – Switzerland, …)

- four lectures on selected topics in Computer Science
  - 4 x 20 lessons, i.e. 60h total

- participants
  - 10-15 third/fourth-year undergraduates from both countries
  - open to all SNU CoE students with a sufficient background in Computer Science and Engineering
  - sufficient proficiency in English

Summer University 2016 – Overview

- **Location**: HEIG-Vd, Yverdon-les-Bain

- **Date**: July 4 to 22, 2016
  - July 4 to 6: French crash course
  - July 8 to 21: lectures in selected topics of Computer Science

- **Participants SNU CoE**
  - lecturers: Prof. Taekyoung “Ted” Kwon, Prof. Bernhard Egger
  - 10 undergraduates

- **Lecture topics**
  - Computer Networks (Prof. Taekyoung Kwon, SNU)
  - Machine Learning (Prof. Stephan Robert, HEIG-Vd)
  - Software Reverse Engineering (Prof. Pascal Junod, HEIG-Vd)
  - The Art of Compiler Construction (Prof. Bernhard Egger, SNU)

- **Grade/Credits**
  - participants will get a grade and 3 credits in the next semester (“공학지식의 실무 응용”)

Summer University 2016 – Goal

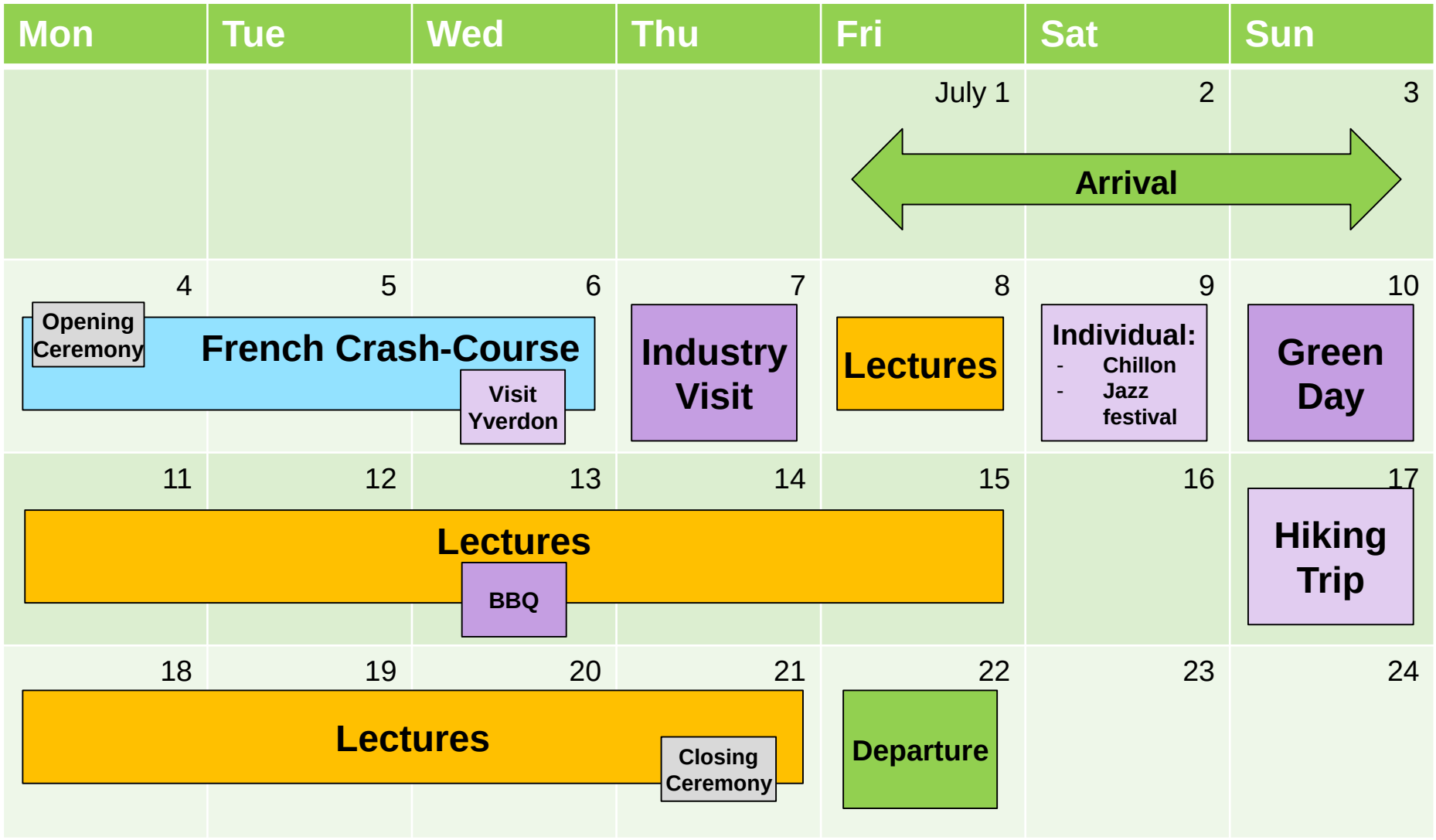
- **This is not going to be (only) a nice paid vacation!**

- **We want to**
  - foster scientific and cultural exchange of our students
  - enable you to experience first hand different countries and customs
  - allow you to build networks and connections

- **We expect you to**
  - to participate actively and work hard
  - to exchange with the Swiss students

- **In return**
  - we pay almost the entire trip for you
  - and you event get credits

Summer University 2016 – Program



Summer University 2016 – Courses

- **Software reverse Engineering**
  Prof. Pascal Junod, HEIG-Vd, Switzerland

  The goal of this lecture is to expose the problematics of software reverse engineering and software protection. After a short introduction about the goals and various uses of reverse engineering as well as the Intel and ARM architectures, we will explain the attack model that can be applied on a binary application, the format of ELF files, the different stages of the life of an executable when running on Linux and give a list of useful tools allowing to perform static and dynamic reverse engineering. Then, we will expose a few software protection techniques, such as obfuscation, code tamper-proofing and code watermarking. The practical parts will consist in breaking easy « crackmes » in a Linux environment.

- **Machine Learning**
  Prof. Stephan Robert, HEIG-Vd, Switzerland

  During the past decade Machine Learning, which is the science of getting computers to act without being explicitly programmed, has experienced huge progresses in the development of methods, models and practices. Machine Learning, which has given us practical speech recognition, effective web search, Netflix and Amazon recommendations, … is so pervasive today that certainly everyone is using it many times without knowing it. In this course you will learn about the main used Machine Learning techniques with an emphasis on Kaggle competitions. Topics include : gradient descent, logistic regression model, neural networks, decision trees and unsupervised learning (clustering, feature engineering).

Summer University 2016 – Courses

- **Computer Networks**
  Prof. Ted “Taekyoung” Kwon, Seoul National University, Korea

  Internet overview, IP addressing, subnetting/supernetting, IP routing, ICMP, DHCP, ARP, DNS, TCP, UDP, TCP congestion control, IP multicasting, Internet security, Internet of Things, Software Defined Networks.

- **The Art of Compiler Construction**
  Prof. Bernhard Egger, Seoul National University, Korea

  Writing a compiler is considered to be a very challenging task. Indeed, writing a compiler not only requires knowledge of the most basic computer-science topics such as algorithms and data structures, but also a significant understanding of computer architecture. Compilers are also an excellent example of the interaction of theory and practice.

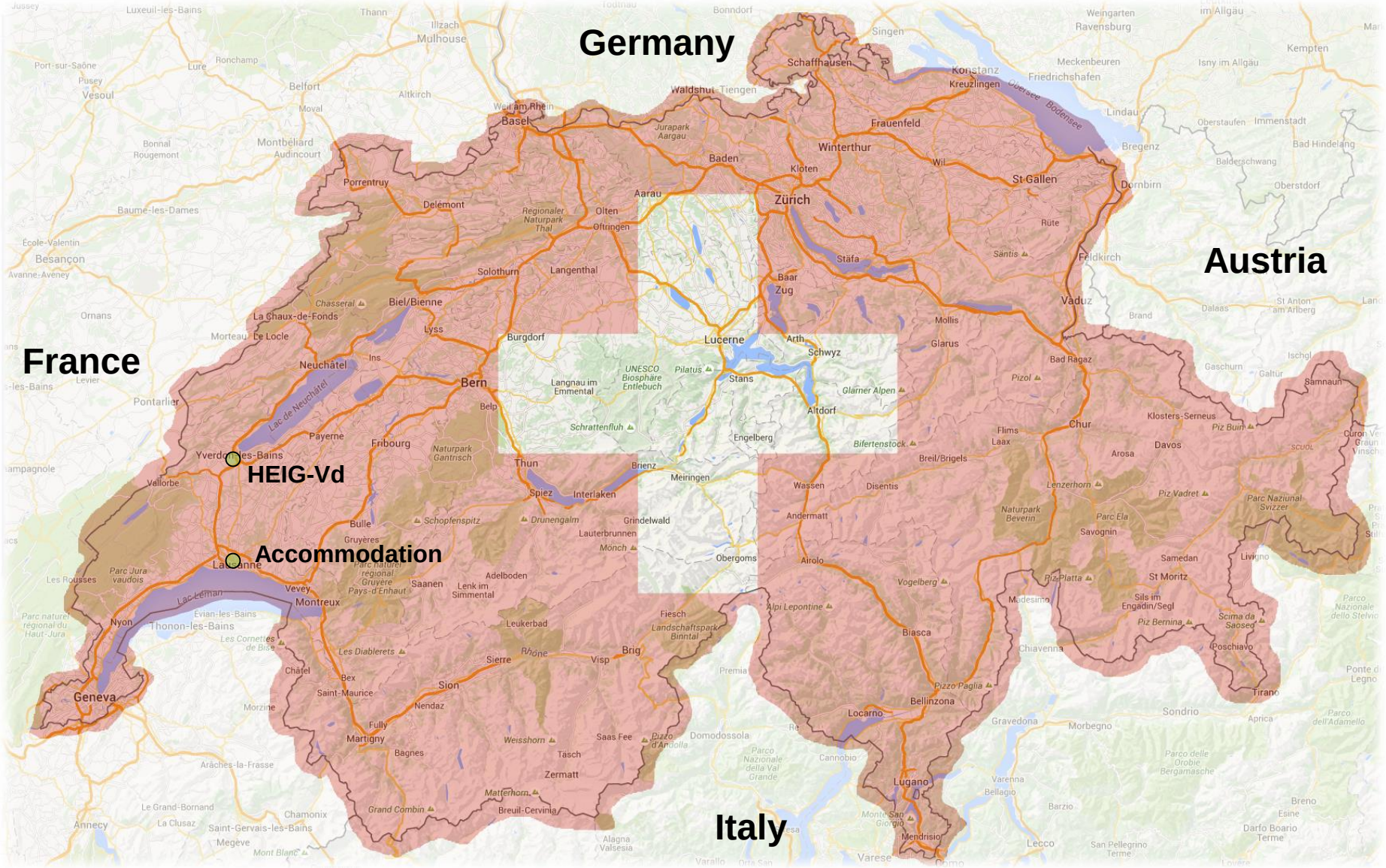
  In this course, we are going to demystify compiler construction by building a simple, yet functional compiler. The course will take us through the main ideas of compiler construction from lexical analysis, parsing, abstract syntax trees, types and type checking, intermediate languages, code generation and runtime systems.

  Course prerequisites: algorithms & data structures, programming, knowledge of C

Summer University 2016 – HEIG-Vd

- **HEIG-Vd is the School of Business and Engineering**
  - "Haute Ecole d'Ingénierie et de Gestion du Canton de Vaud«
  - branch of the University of Applied Sciences and Arts, Western Switzerland
  - one of (very few) universities in Switzerland
  - very practical, lots of collaboration with industry
  - offers Bachelor and Master degrees
  - http://www.heig-vd.ch/international

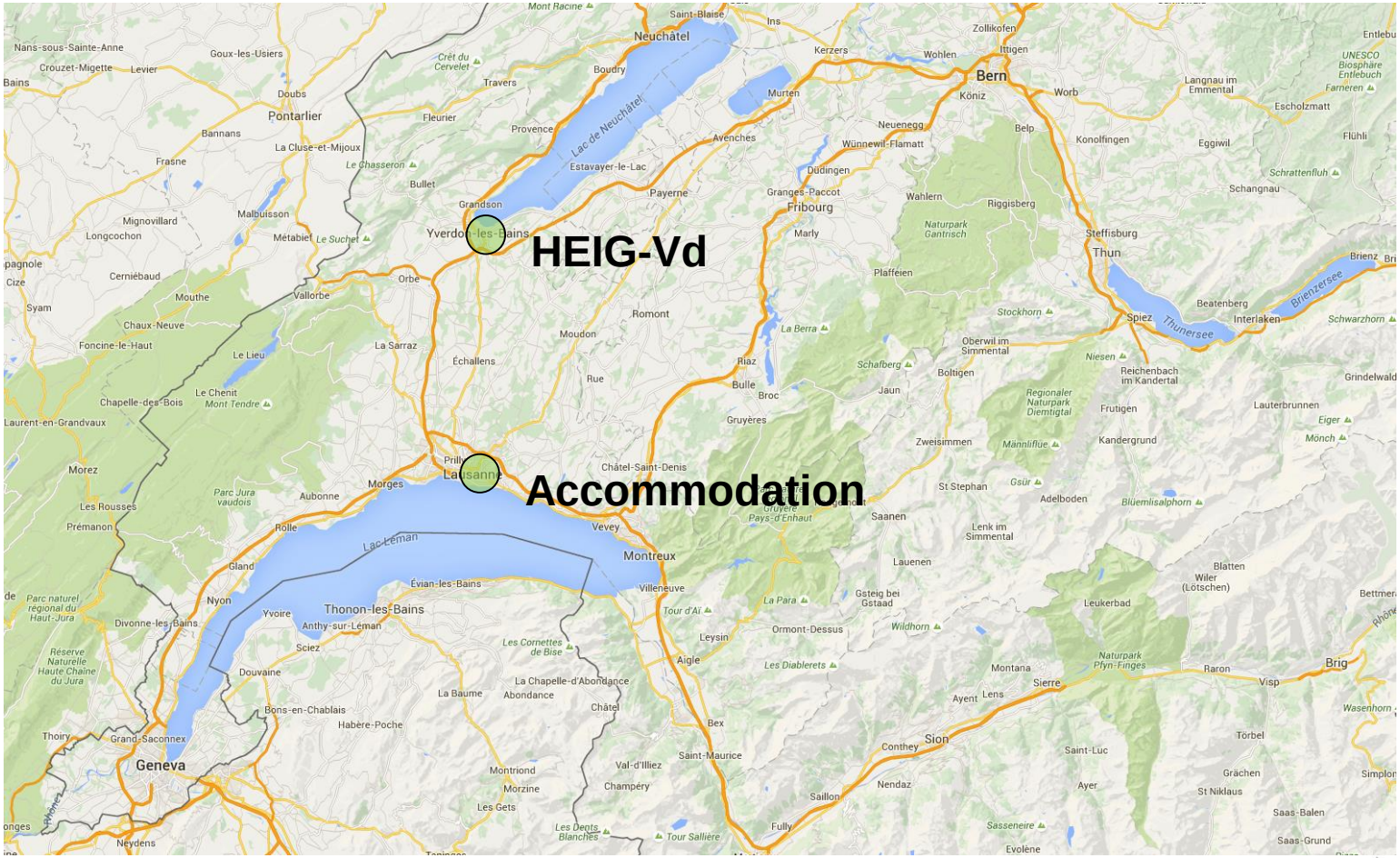
Summer University 2016 – Location Overview



ENGINEERING
COLLEGE OF ENGINEERING
SEOUL NATIONAL UNIVERSITY
서울대학교 공과대학

Summer University 2016 – Location

- HEIG-Vd is located in Yverdon-les-Bains
- The accommodation is located in Écublens, Lausanne (next to EPFL)



Summer University 2016 – HEIG-Vd

- The HEIG-Vd Computer Science department is located in the St-Roch campus

Summer University 2016 – Accommodation

- Student and faculty housing in Écublens, Lausanne (next to EPFL)
- Deposit per room: CHF 100 (returned when moving out)
- You will cook your own breakfast and dinner
  - kitchen and kitchen utensils available
- We need to take the train (~25 min) to get to HEIG-Vd St-Roch
  - tickets provided

Summer University 2016 – Cost

- **Paid for by the College of Engineering**
  - flight
  - accommodation
  - lunch during class days
  - local transportation
    - Geneva airport ⇔ accommodation
    - accommodation ⇔ campus
    - it's a one-month pass for the Lausanne-Yverdon region

- **You need to take care of**
  - travel insurance
  - breakfast and dinner, lunch on weekends
  - CHF 100 deposit for the room
  - individual activities

Summer University 2016 – Selection Process

- **Eligible to apply**
  - undergraduate students of the College of Engineering
  - in principle third and fourth-year students, exceptions can be made

- **Selection process**
  - sufficient background in Computer Science and Engineering classes
  - sufficient proficiency in English to follow lectures
  - grades and statement

- **Application form**
  - on CoE and CSE homepage (links on next page)

Application deadline: Friday, April 29, 10:00 am

Summer University 2016 – Q&A

- **More information & application forms**
  - Summer University 2016 HEIG-Vd official page
    http://www.stephan-robert.ch/summer-university/2016-summer-university/
  - CoE announcement
    http://eng.snu.ac.kr/node/13552
  - CSE announcement
    http://cse.snu.ac.kr/node/20293