

**Everybody in this country should
learn to program a computer...
because it teaches you how to think**

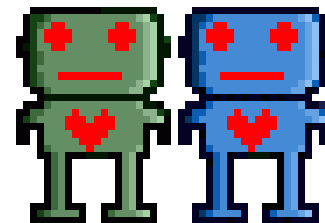
Steve Jobs, co-founder and CEO of Apple Inc. (1955 - 2011)



Week 1: Introduction to Lab

Welcome to KAIST CS101

- Introduction to Programming
- Goal of CS101: Understanding two things
 - Programming skills
 - It is needed in all areas of science and engineering
 - Computational thinking
 - It influences how you go about solving a problem
- Course structure
 - Lectures
 - Lab works
 - Homework
 - Midterm/Final exams



Course schedule

Google calendar: <https://goo.gl/tt4Ppj>

| March | | | | |
|---------------------|-------------------------------|---------------------|---------------------|---------------------|
| Mon | Tue | Wed | Thur | Fri |
| | Lect 1 Lab 1 (C/D) | Samiljeol | Lab 1 (G/H) | Lab 1 (I/J) |
| | February 28 | 1 | 2 | 3 |
| Lab 1 (A/B) | Lect 2 Lab 2 (C/D) | Lab 1 (E/F) | Lab 2 (G/H) | Lab 2 (I/J) |
| 6 | 7 | 8 | 9 | 10 |
| HW 1 Lab 2 (A/B) | Lect 3 Lab 3 (C/D) | Lab 2 (E/F) | Lab 3 (G/H) | Lab 3 (I/J) |
| 13 | 14 | 15 | 16 | 17 |
| Lab 3 (A/B) OH 1 | Lect 4 Lab 4 (C/D) OH 2 | Lab 3 (E/F) OH 3 | Lab 4 (G/H) OH 4 | Lab 4 (I/J) OH 5 |
| 20 | 21 | 22 | 23 | 24 |
| Lab 4 (A/B) | Lect 5 Lab 5 (C/D) | Lab 4 (E/F) | Lab 5 (G/H) | Lab 5 (I/J) |
| 27 | 28 | 29 | 30 | 31 |

| May | | | | |
|---------------------|----------------------------------|-------------------------------------|-------------------------------------|----------------|
| Mon | Tue | Wed | Thur | Fri |
| HW 3 Lab 7 (A/B) | | Buddha's Birthday | | Children's Day |
| 1 | 2 | 3 | 4 | 5 |
| | Lect 8 Lab 8 (C/D) | Lab 8 (E/F) | Lab 8 (G/H) | Lab 8 (I/J) |
| 8 | 9 | 10 | 11 | 12 |
| Lab 8 (A/B) | Lect 9 Lab 9 (C/D) | Lab 9 (E/F) | Lab 9 (G/H) | Lab 9 (I/J) |
| 15 | 16 | 17 | 18 | 19 |
| HW 4 Lab 9 (A/B) | Lect 10 | Spring Student Festival 24 | Spring Student Festival 25 | 26 |
| 22 | 23 | | | |
| OH 11 | Lect 11 Lab 10 (C/D) OH 12 | Lab 10 (E/F) OH 13 | | |
| 29 | 30 | 31 | | |

| April | | | | |
|---------------------|-----------------------|---------------------|-------------|-------------|
| Mon | Tue | Wed | Thur | Fri |
| HW 2 Lab 5 (A/B) | Lect 6 Lab 6 (C/D) | Lab 5 (E/F) | Lab 6 (G/H) | Lab 6 (I/J) |
| 3 | 4 | 5 | 6 | 7 |
| Lab 6 (A/B) OH 6 | OH 7 | Lab 6 (E/F) OH 8 | OH 9 | OH 10 |
| 10 | 11 | 12 | 13 | 14 |
| Mid Exam | | | | |
| 17 | 18 | 19 | 20 | 21 |
| | Lect 7 Lab 7 (C/D) | Lab 7 (E/F) | Lab 7 (G/H) | Lab 7 (I/J) |
| 24 | 25 | 26 | 27 | 28 |

| June | | | | |
|-----------------------|--------------|-------|-----------------------|-----------------------|
| Mon | Tue | Wed | Thur | Fri |
| | | | Lab 10 (G/H) OH 14 | Lab 10 (I/J) OH 15 |
| | | | 1 | 2 |
| Lab 10 (A/B) OH 16 | Memorial Day | OH 17 | OH 18 | OH 19 |
| 5 | 6 | 7 | 8 | 9 |
| Final Exam | | | | |
| 12 | 13 | 14 | 15 | 16 |

Policy for grading

- CS101 grading consists of two parts: theory and practice
 - **Theory points**
 - 100 points for midterm exam
 - 100 points for final exam
 - **Practice points**
 - 100 points for lecture attendance
 - 100 points for lab work (quiz, tasks)
 - 200 points for homework
 - Students need to collect **at least 340** practice points
- **The final score is determined entirely by the theory point**
 - Practice point is just a **qualification**
You will get F grade if your practice point is below 340

| Example | Student A | Student B |
|-----------------|-----------|-----------|
| Theory points | 170 | 197 |
| Practice points | 340 | 339 |
| Final grade | B | F |

Student B



Tasks

- You should finish the given tasks within each lab session
 - TA will check your program
 - You have to explain your source code when TA checks your code
- Don't do the tasks at home !
 - We will reset your codes.

Tasks

- If you are absent from your lab, you can participate in another lab in the same week
 - However, if you take another lab, you get 50% of lab point as a penalty
 - If you don't participate in any other lab as well as your lab, your lab score for the week is zero
 - **Absolutely no exceptions...**
 - No e-mail evaluation for lab work
 - No evaluation for previous lab work
 - **The only accepted excuse is your own death**



Quiz

- There will be a **quiz time** in each lab
 - 4 points are assigned for quiz
 - If you don't have a quiz, you can get 6 points for the lab attendance
 - Quiz will start at the beginning of the lab session.
 - So, please be on time !
- You have to concentrate on your lecture!
- Reviewing the lecture materials is recommended.
- We will have a practice quiz shortly.

Homeworks

- There will be 4 homeworks (50 practice points each).
 - **No additional homework** for the students who have not collected 340 practice points.
- Homework schedule is as follows.
 - HW#1: 03/13(Mon) – 03/22(Wed)
 - HW#2: 04/03(Mon) – 04/12(Wed)
 - HW#3: 05/01(Mon) – 05/10(Wed)
 - HW#4: 05/22(Mon) – 05/31(Wed)
- The details will be announced when each homework is released.
- If you are faced with some problems when you are trying to solve your homework,
 - **Do not copy your friends' homework**
 - Even just copying only one method, it's also regarded as cheating
 - **Ask TAs to help you.**
 - Use TA's office hour!

**Copier and source provider
will obviously get F grade
as well as suspension from school**

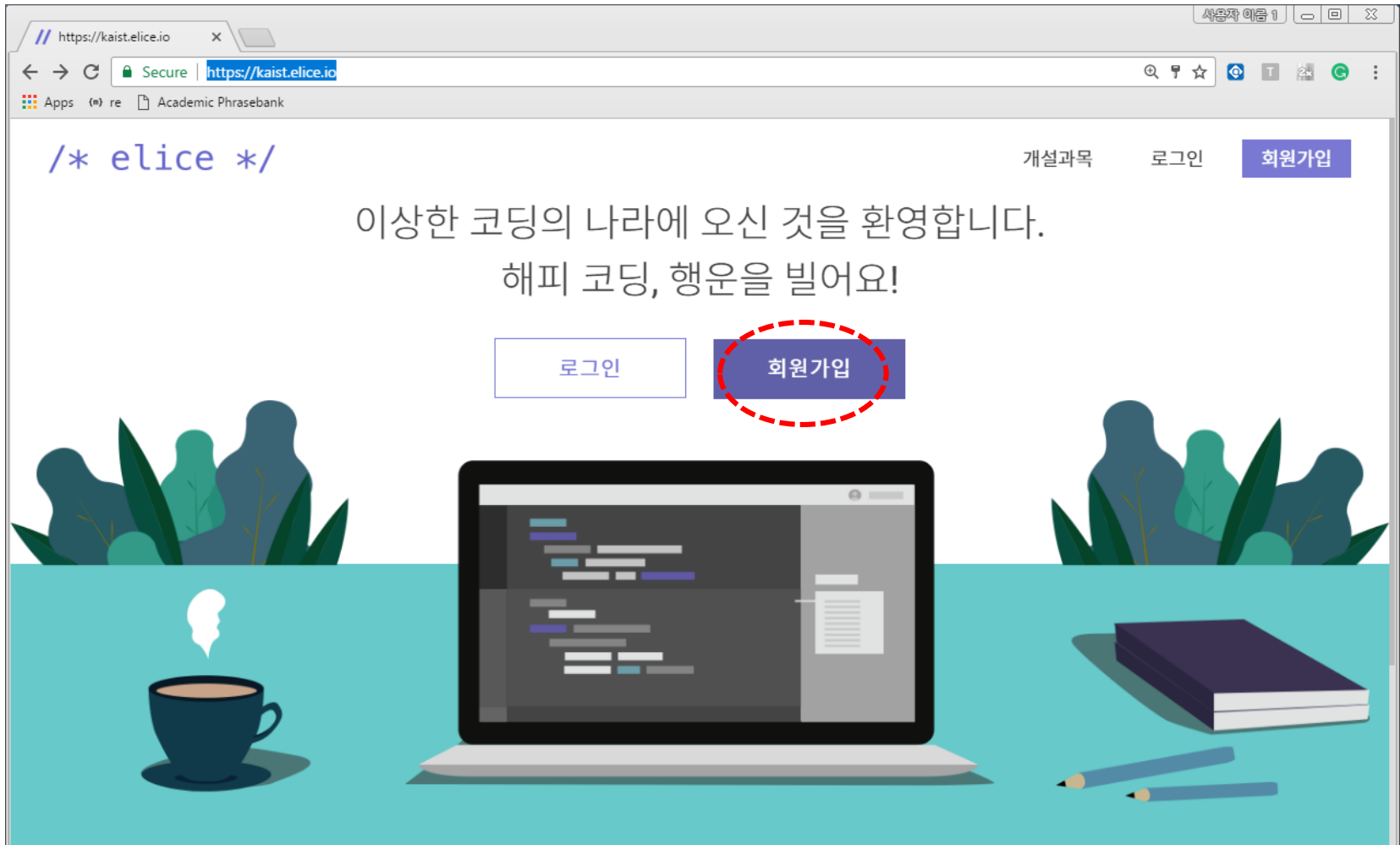
TA's Office Hour

- TA's office hour schedule is as follows.
 - Creative Bldg. #307, 21:00 ~ 22:30
 - Marked as "OH" in course schedule
 - 03/20(Mon), 03/21(Tue), 03/22(Wed), 03/23(Thu), 03/24(Fri)
 - 04/10(Mon), 04/11(Tue), 04/12(Wed), 04/13(Thu), 04/14(Fri)
 - 05/29(Mon), 05/30(Tue), 05/31(Wed), 06/01(Thu), 06/02(Fri)
 - 06/05(Mon), 06/07(Wed), 06/08(Thu), 06/09(Fri)
- You can ask
 - Lecture
 - Lab
 - Homework
 - Something you want to know
 - CS101
 - University life
 - ETC

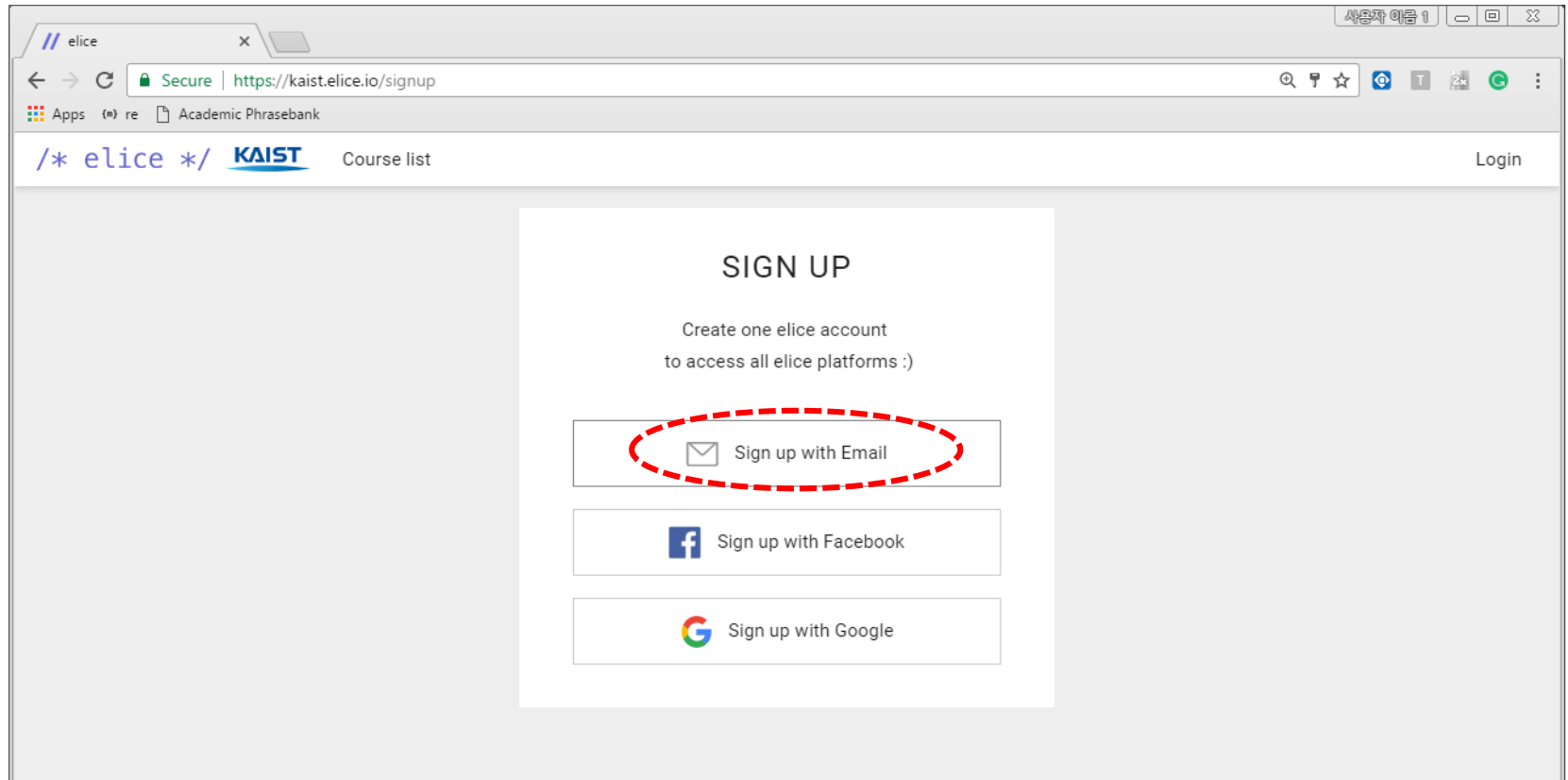
CS101 homepage

- During the semester, we use elice as our homepage
 - <https://kaist.elice.io/>
- Check elice at least once a day not to miss an important notice
 - HWs
 - Change of schedule
 - Claim period
 - Term exam
- Join the elice as a student member
- Write your identification correctly
 - Real name
 - KAIST email address
 - Student ID number

Sign up steps (1)



Sign up steps (2)



Sign up steps (3)

The screenshot shows a web browser window with the URL <https://kaist.elice.io/signup/email>. The page title is "Sign up with Email". Below the title, it says "Create one elice account to access all elice platforms :)". The form contains the following fields:

- Email:** A text input field containing "csehong@kaist.ac.kr".
- Password:** Two text input fields, both containing ".....".
- Name:** Two text input fields, the first containing "Sungeun" and the second containing "Hong".
- Age Confirmation:** A checkbox labeled "I'm over age 18." which is checked.
- Complete signup:** A blue button at the bottom of the form.

The entire form is highlighted by a red dashed circle. The browser's address bar shows the URL, and the page header includes the elice logo, KAIST logo, and a "Login" link.

Sign up steps (4)

The screenshot shows a web browser window with the URL <https://kaist.elice.io/signup/email>. The page is titled "Terms & Agreement" and features a checkbox that is checked, indicating agreement to the Terms of Service, Privacy Policy, Selective Privacy Policy (optional), and to receiving promotional emails (optional). Below this, a blue button labeled "Complete signup" is highlighted with a red dashed oval. At the bottom, a list of terms with checkboxes shows that "Terms of Service", "Privacy Policy", "Selective Privacy Policy (Optional)", and "Receive promotional emails (Optional)" are all checked.

elice x

Secure | <https://kaist.elice.io/signup/email>

Apps (n) re Academic Phrasebank

/* elice */ KAIST Course list Login

Terms & Agreement

☒ I agree to the Terms of Service, Privacy Policy, Selective Privacy Policy (optional), and to receiving promotional emails (optional).

Complete signup

- ▶ Terms of Service * ☒
- ▶ Privacy Policy * ☒
- ▶ Selective Privacy Policy (Optional) ☒
- Receive promotional emails (Optional) ☒

Sign up steps (5)

The screenshot shows a web browser window with the URL <https://kaist.elice.io/login>. The page header includes the elice and KAIST logos, and a 'Sign up' link. The main content area features the KAIST logo and the word 'LOGIN'. A login form is centered on the page, with the email field containing 'csehong@kaist.ac.kr' and the password field masked with dots. A red dashed oval highlights the email and password fields. Below the form is a 'Remember Me' checkbox, a blue 'Login' button, a 'Forgot Password?' link, and social login options for Facebook and Google.

KAIST

LOGIN

csehong@kaist.ac.kr

.....

☐ Remember Me

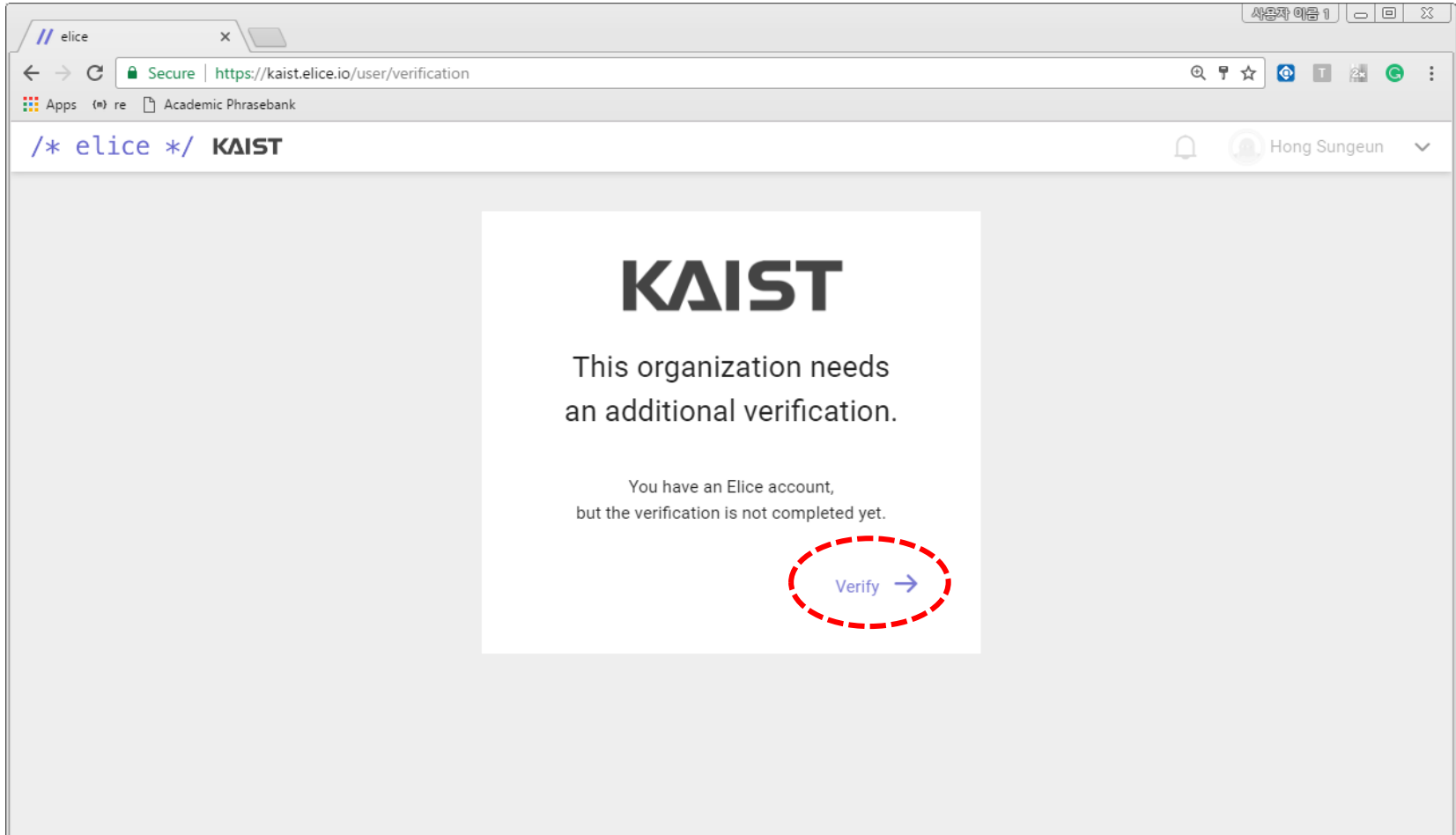
Login

[Forgot Password?](#)

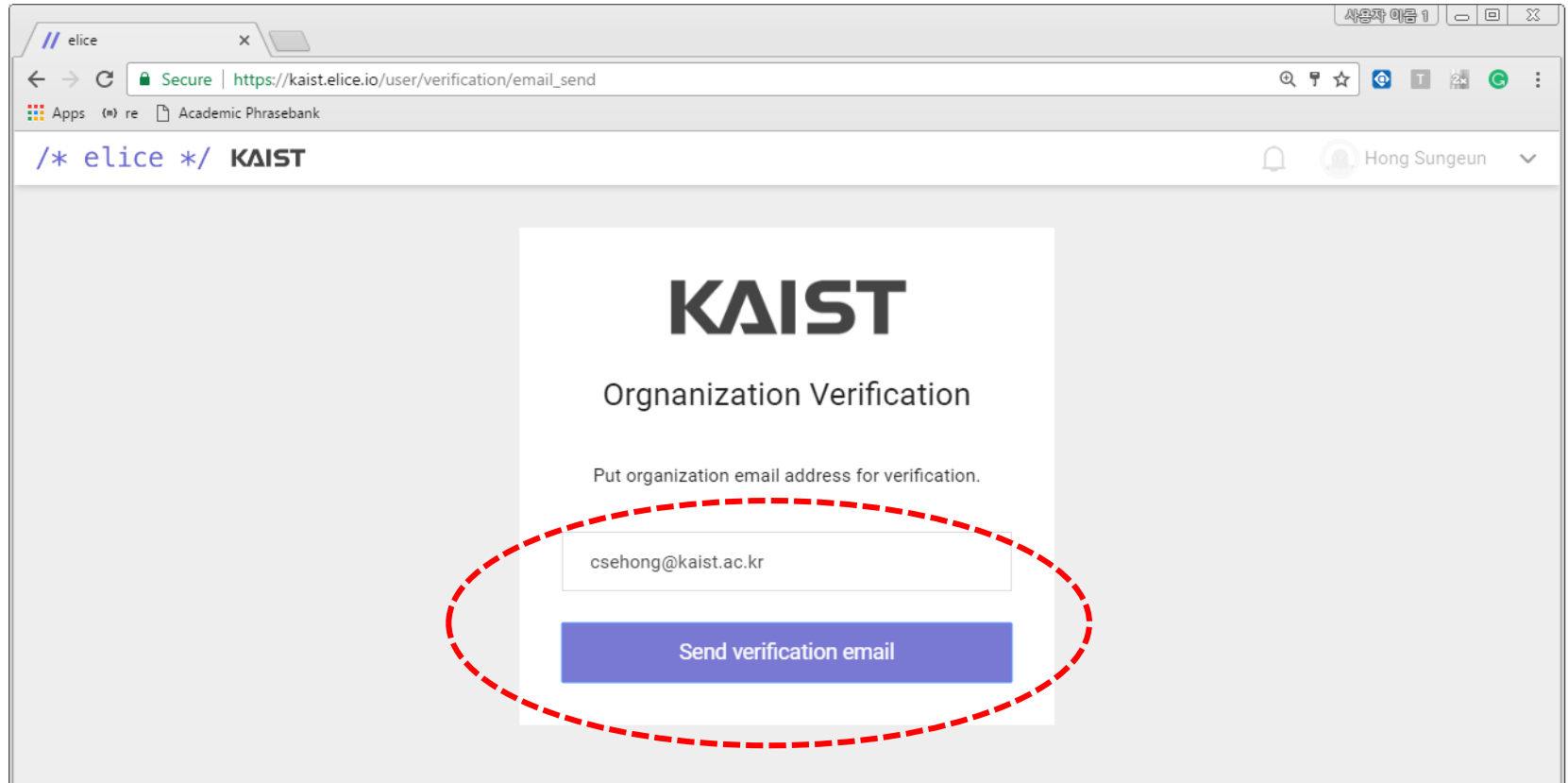
Facebook

Google

Sign up steps (6)



Sign up steps (7)



The screenshot shows a web browser window with the address bar displaying `https://kaist.elice.io/user/verification/email_send`. The page header includes the text `/* elice */ KAIST` and a user profile for `Hong Sungeun`. The main content area features the **KAIST** logo, the title **Organization Verification**, and the instruction `Put organization email address for verification.`. Below this, there is a text input field containing the email address `csehong@kaist.ac.kr` and a blue button labeled `Send verification email`. A red dashed oval highlights the input field and the button.

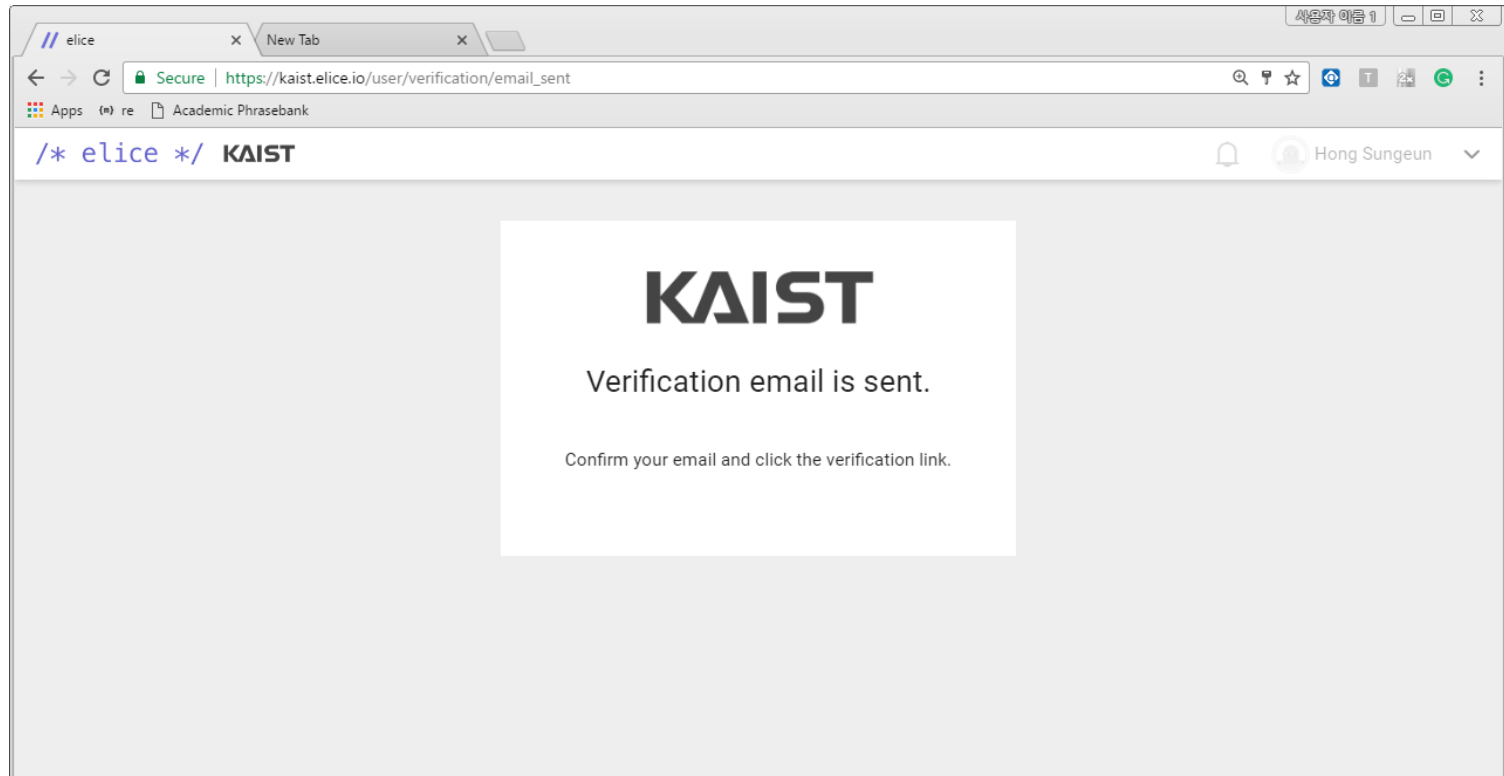
KAIST

Organization Verification

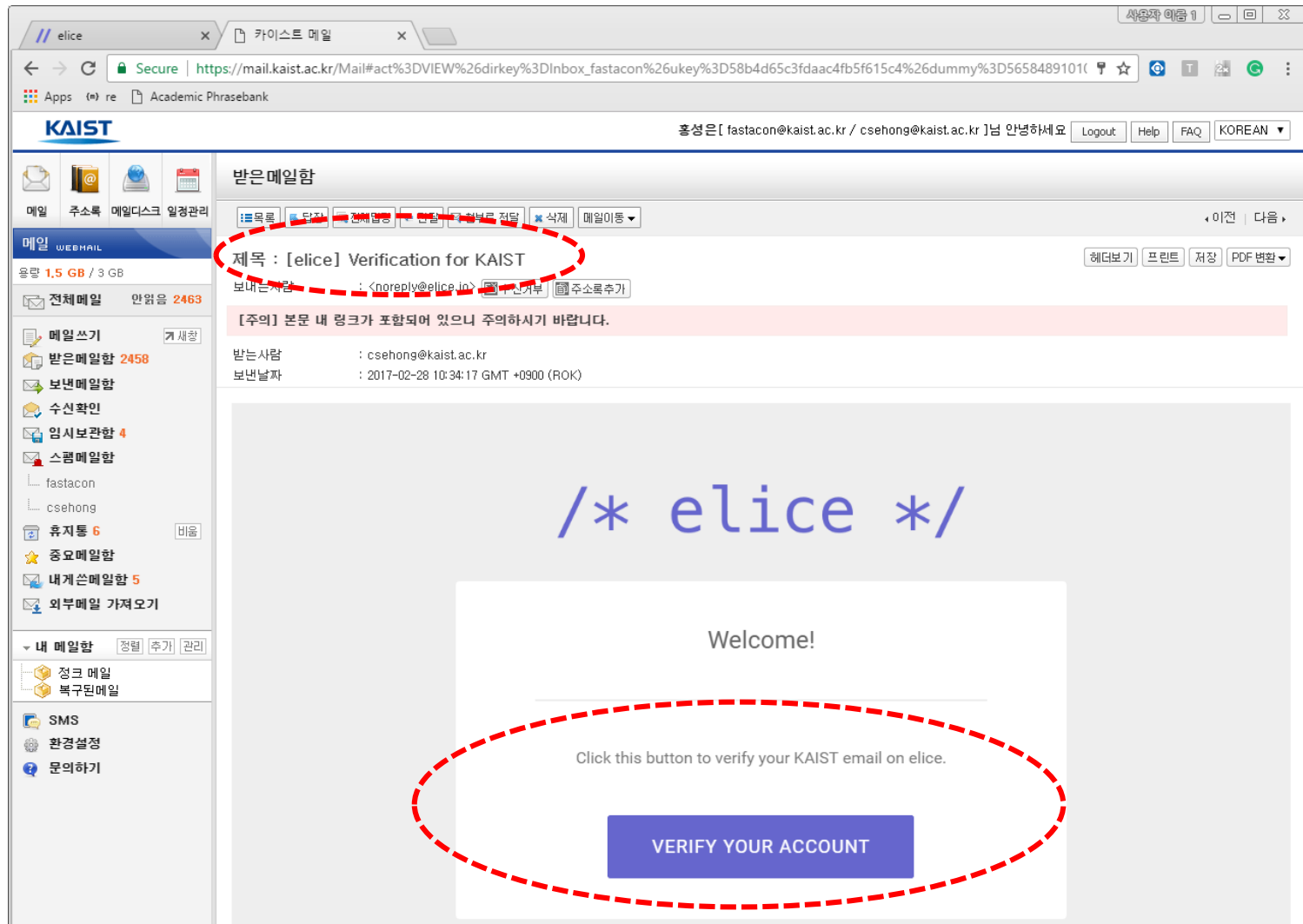
Put organization email address for verification.

[Send verification email](#)

Sign up steps (8)



Sign up steps (9)



Sign up steps (10)

The screenshot shows a web browser window with the URL https://kaist.elice.io/user/verification/email_verify?token=nbYwfgzSW7EWYePU&user=eyJwcm9maWxlX3VybCI6IG51bGwslCJmaXJzdG5hbWUi. The page header includes the elice logo and KAIST name. The main content area displays the KAIST logo and the text "Register student / company number". Below this, it says "Put your student/company number." and shows a text input field containing "20125543". A blue "Register" button is positioned below the input field. A red dashed oval highlights the input field and the Register button.

KAIST

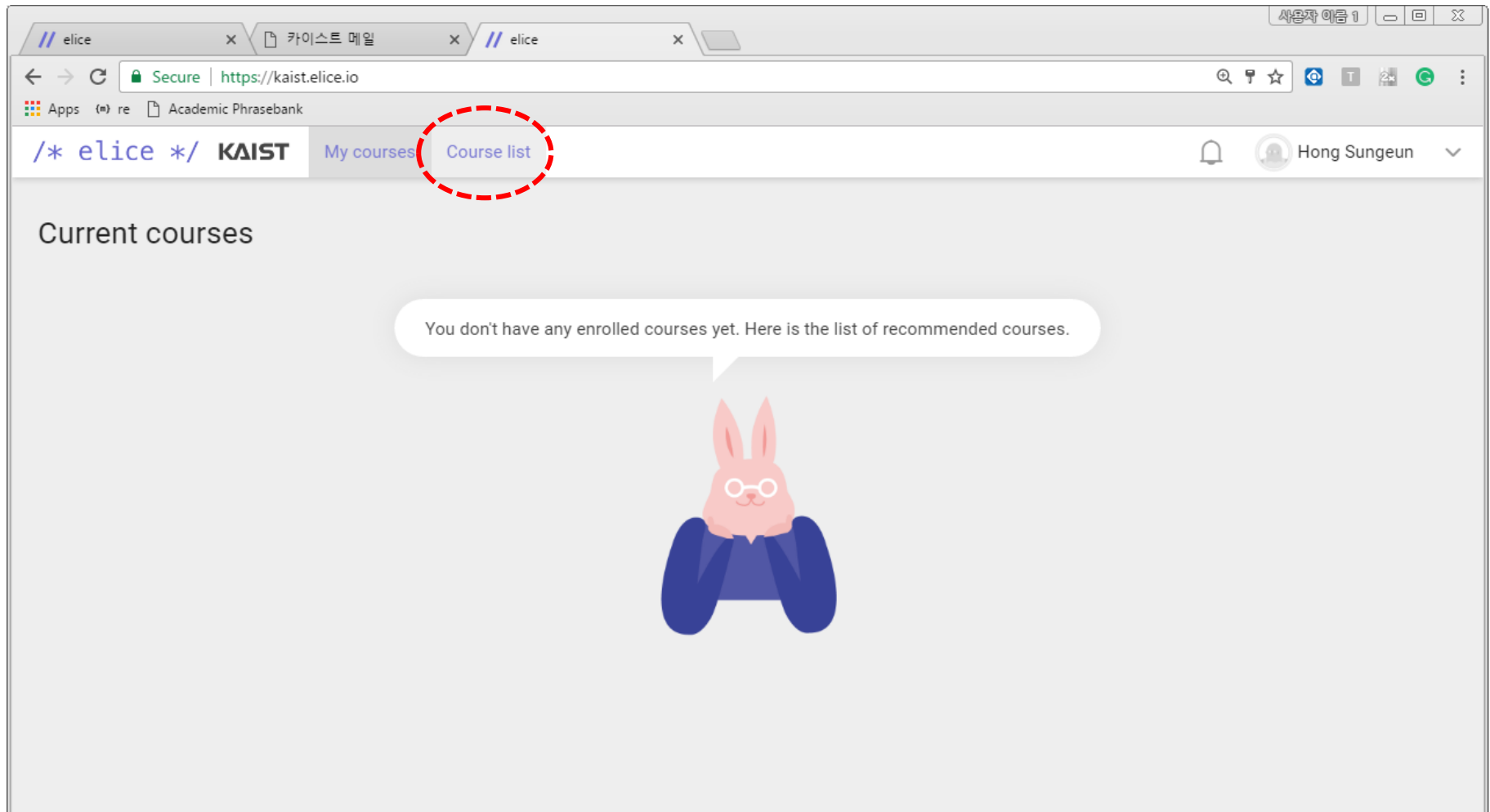
Register student / company number

Put your student/company number.

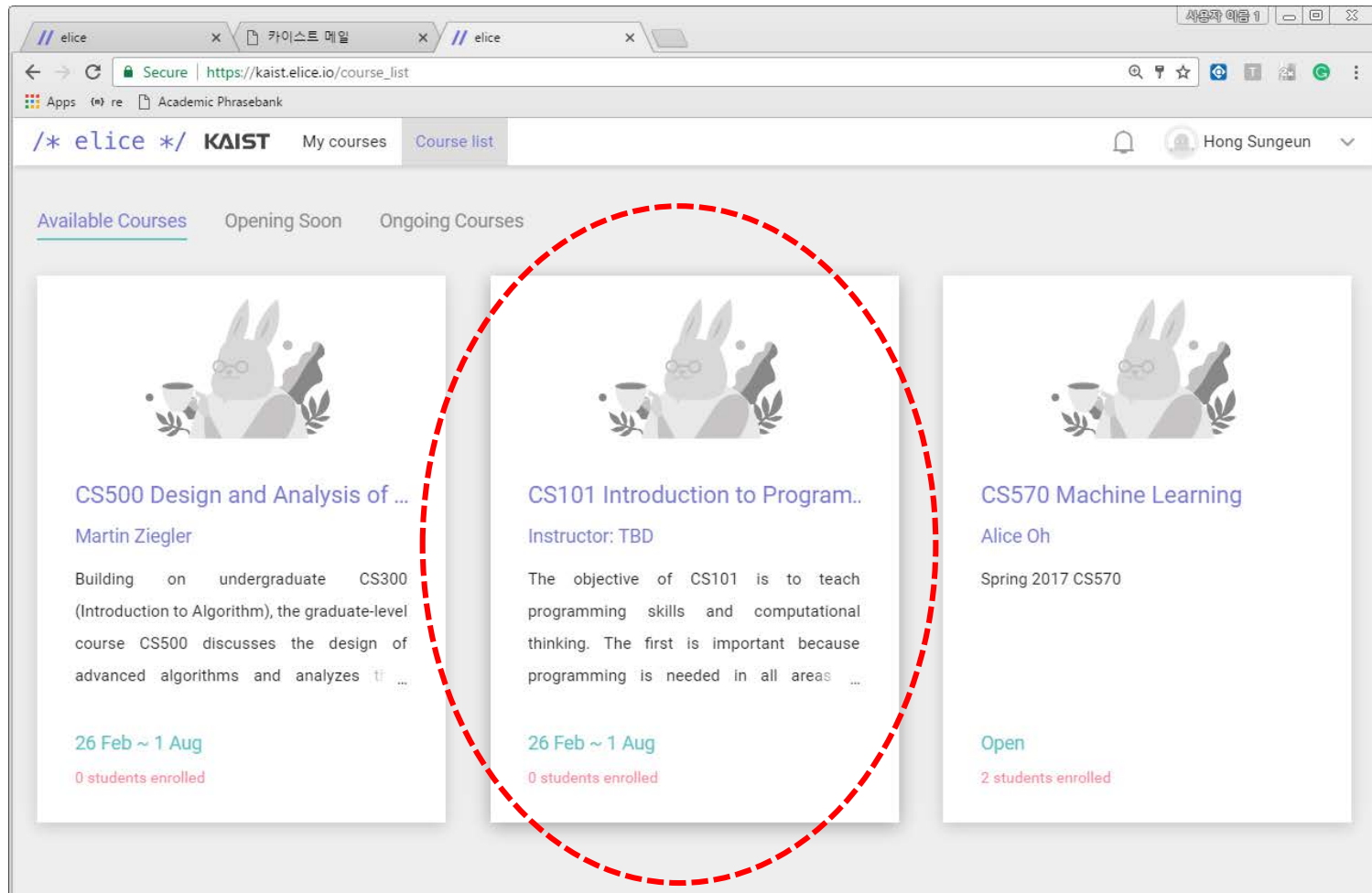
20125543

Register

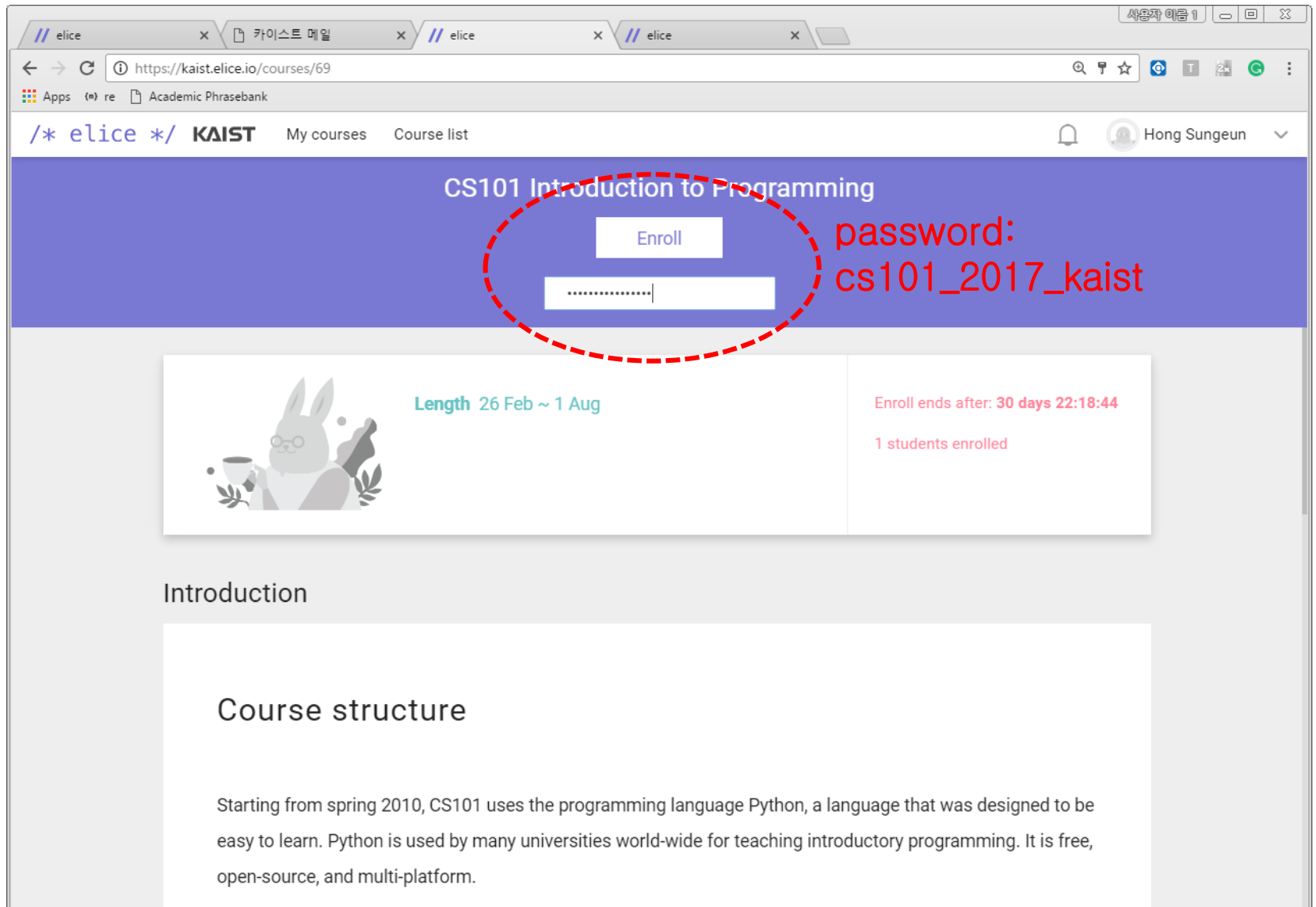
Sign up steps (11)



Sign up steps (12)



Sign up steps (13)



The screenshot shows a web browser window with the URL <https://kaist.elice.io/courses/69>. The page header includes the elice logo, KAIST, and navigation links for "My courses" and "Course list". The user is logged in as "Hong Sungeun".

The main content area features a blue banner for "CS101 Introduction to Programming". Below the banner, there is an "Enroll" button and a password input field. The password field is highlighted with a red dashed circle, and the text "password: cs101_2017_kaist" is written in red next to it.

Below the banner, there is a section with a rabbit illustration and the text "Length 26 Feb ~ 1 Aug". To the right, it says "Enroll ends after: 30 days 22:18:44" and "1 students enrolled".

The page also includes sections for "Introduction" and "Course structure". The "Course structure" section contains the following text:

Starting from spring 2010, CS101 uses the programming language Python, a language that was designed to be easy to learn. Python is used by many universities world-wide for teaching introductory programming. It is free, open-source, and multi-platform.

Sign up steps (14)

The screenshot shows a web browser window with the URL <https://kaist.elice.io/courses/69/lectures>. The page is for the course "CS101 Introduction to Programming" on the KAIST elice platform. The user is logged in as "Hong Sungeun".

The page layout includes a sidebar on the left with the following items:

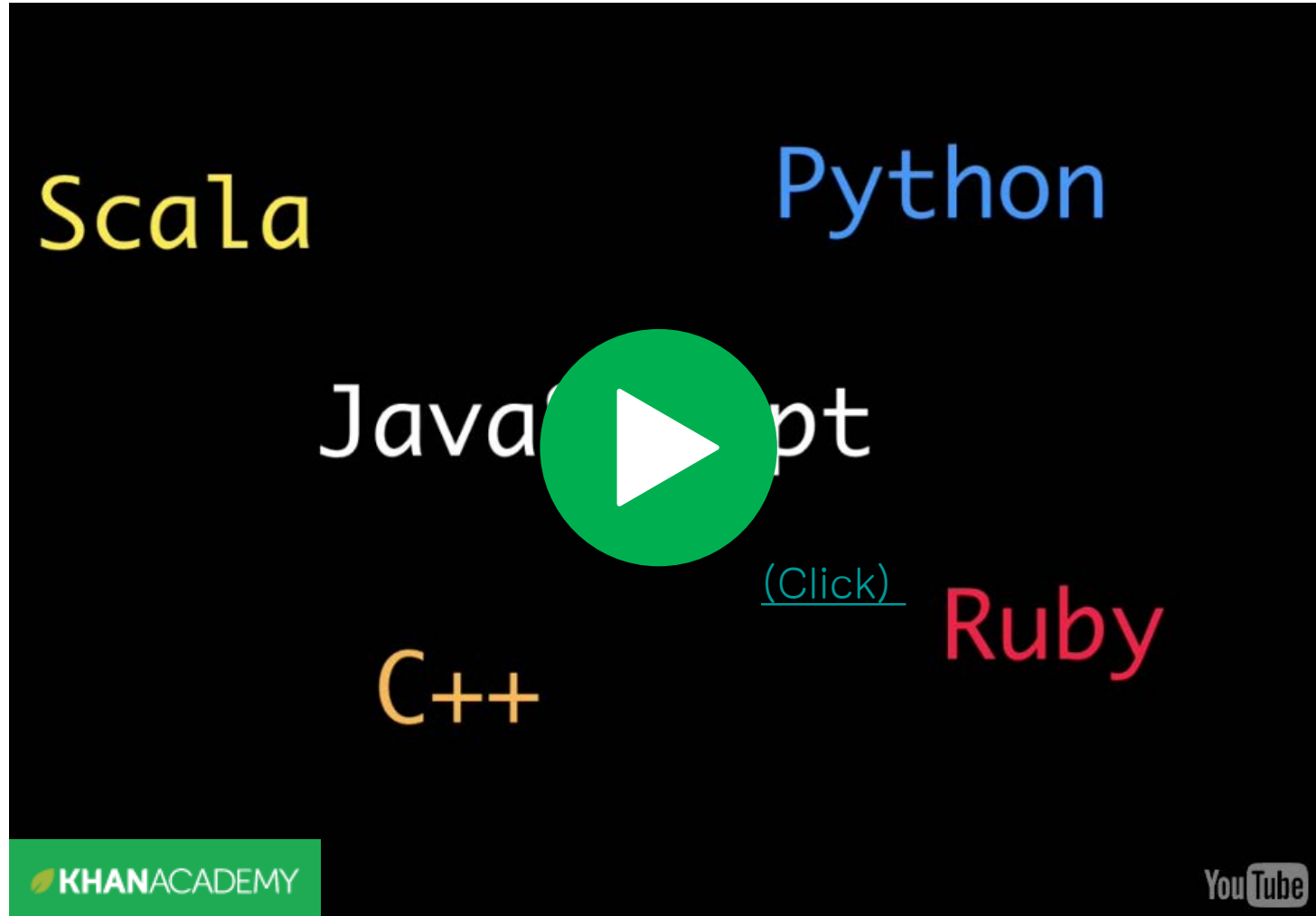
- List of lectures
- Supplement
- Lecture 1
- Lab 1
- Lecture 2
- Lab 2

The main content area has a purple header with the course name and tabs for "Information", "Lectures", and "Boards". Below the header, there is a calendar view showing dates from 26 Feb to 1 Aug. A message states: "There are no lectures to show here." Below this, the "All lectures" section is displayed, showing two main categories:

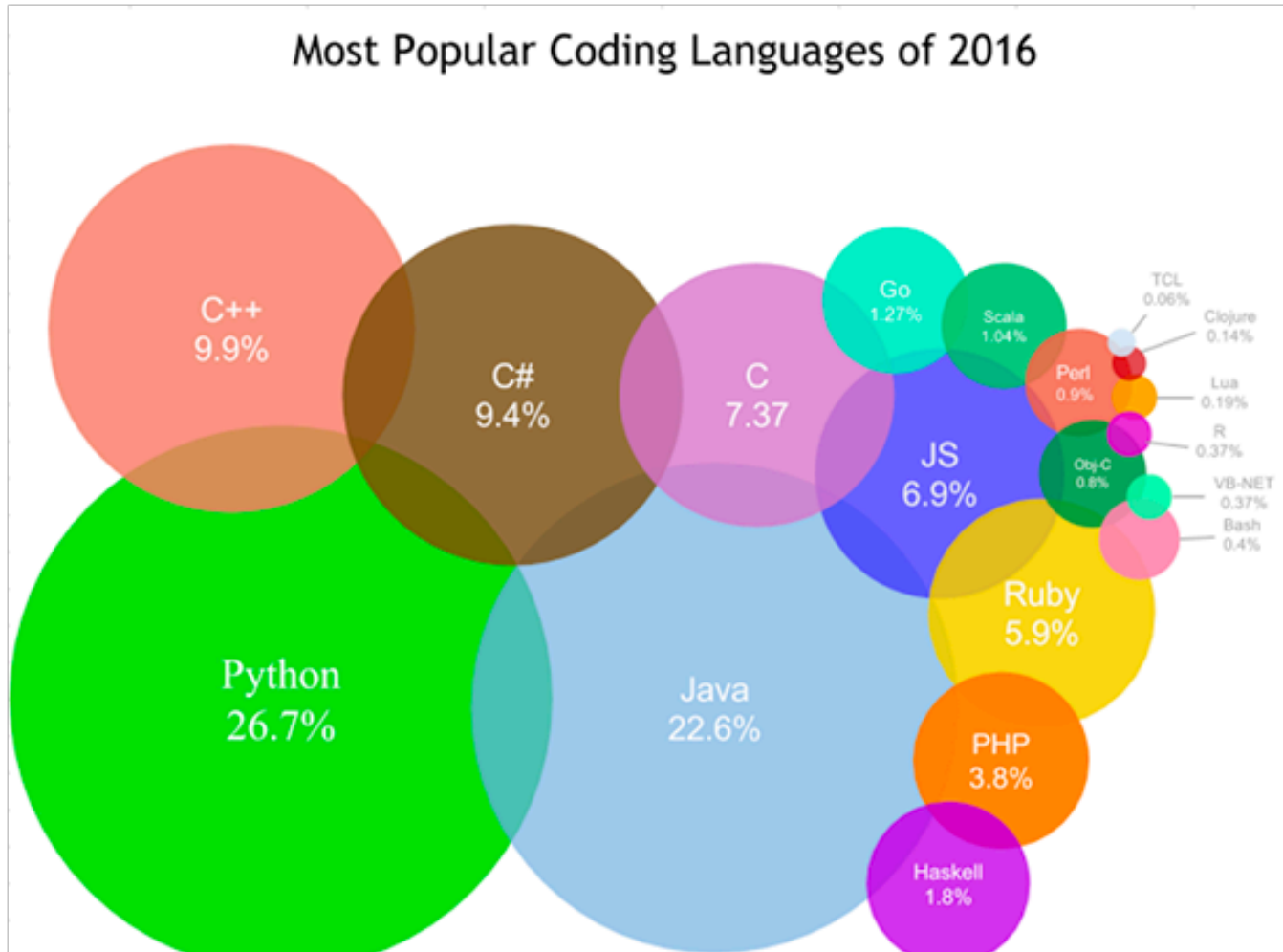
- 01 Supplement** (2017-02-26)
 - 1 Learning programming with Robots
 - 2 Photo processing with cs1media
 - 3 Graphics tutorial (for lecture 6 & lab 6)
- 02 Lecture 1** (2017-02-27)
 - 1 Lecture 1 Slides

Programming

What is programming?



Python



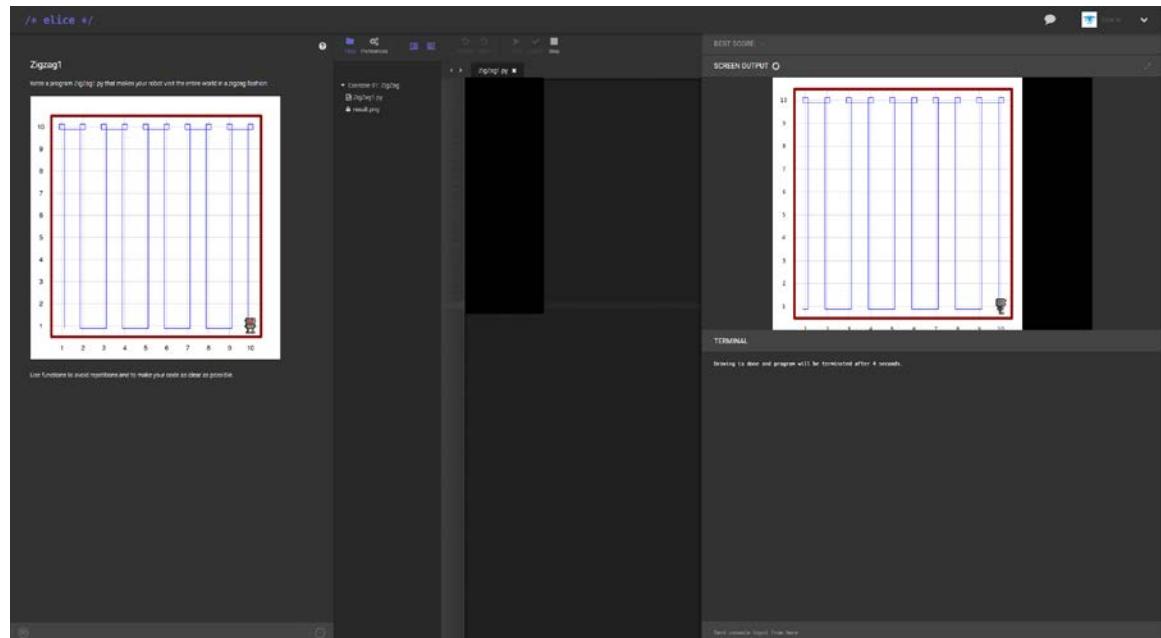
Python



- Programming language
- <https://www.python.org>
- Two versions
 - Python 2.x, Python 3.x
 - Python 2.x is legacy, Python 3.x is the present & future of the language
 - We choose **Python 3** in CS101 course
- Used in
 - Scientific computation
 - Many universities for introductory courses
 - From embedded platforms to computer games
 -  TensorFlow™ [\(Deep learning\)](#)

Elice

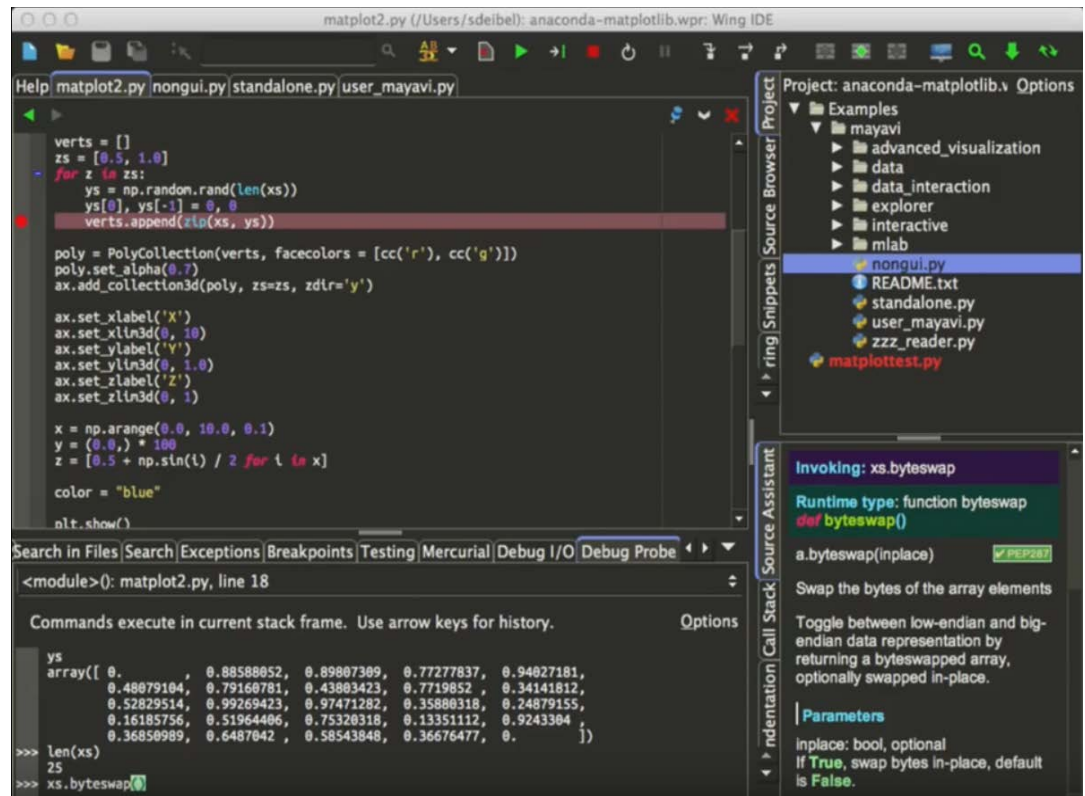
- Online programming education platform
- Used in
 - CS206 Data structure
 - CS570 Machine learning
 - Machine learning summer school
- In CS101 course, we also use Elice
 - Lab tasks
 - Quiz
 - HWs
- <https://kaist.elice.io/>



A screenshot of elice platform

Integrated Development Environment (IDE)

- A software application that provide comprehensive facilities to computer programmers for software development
 - Source code editor
 - Build automation
 - Debugger
 - Documents
- IDEs for Python
 - Wing IDE
 - PyCharm
 - Eclipse with PyDev
 - Vim
 - Emacs

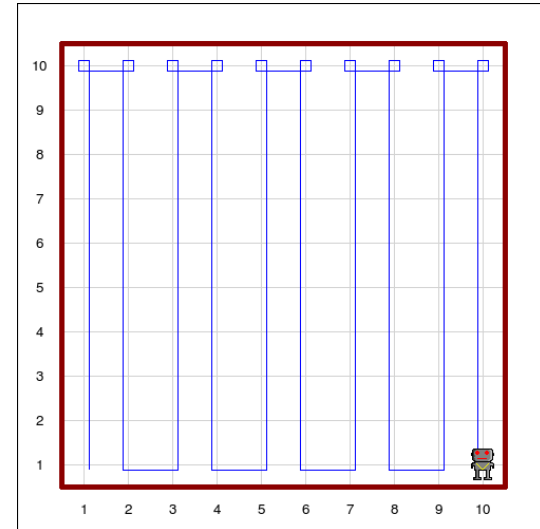


A screenshot of Wing IDE

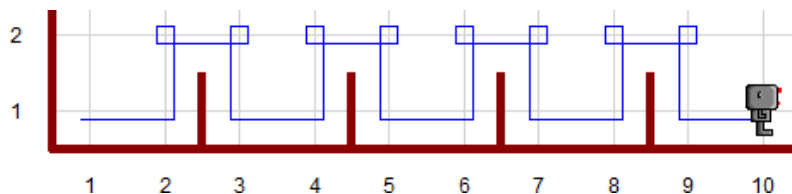
Tasks

Tasks

- Practices with functions and for-loops
- Task#1: ZigZag
 - Create a default world.
 - Add a robot.
 - Make the robot visit the entire world in a zigzag fashion.



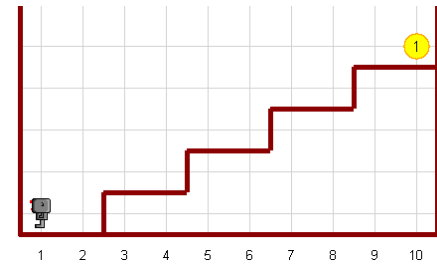
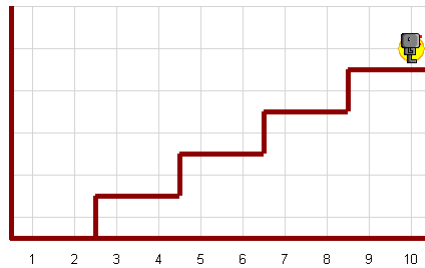
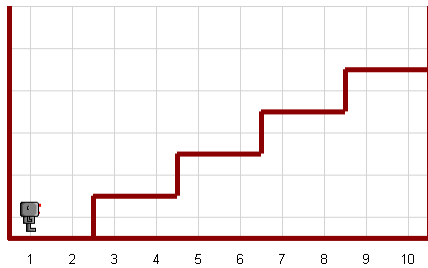
- Task#2: Hurdle
 - Load the world named 'hurdles1.wld'.
 - Add a robot.
 - Make the robot jump all hurdles and pick up the beeper.



Tasks

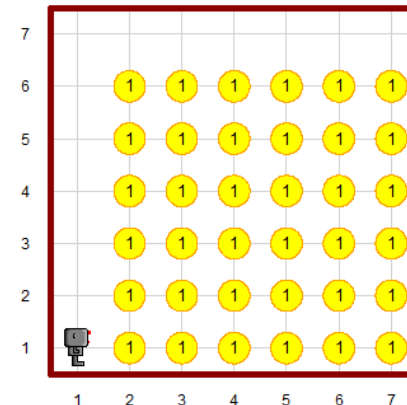
■ Task#3: Newspaper Delivery

- Load the world named 'newspaper.wld'.
- Add a robot with a beeper.
- Make the robot deliver newspapers and return to his starting point.



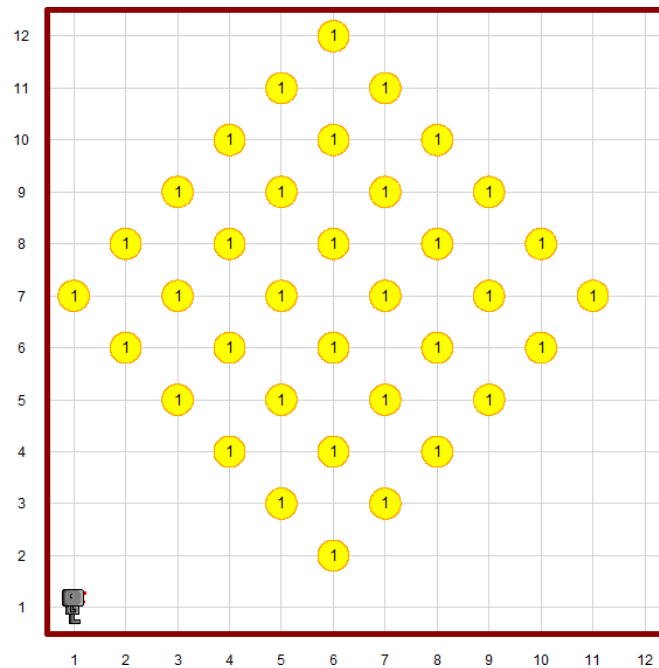
■ Task#4: Harvest

- Load the world named 'harvest1.wld'.
- Add a robot.
- Make the robot harvest all the carrots.



Tasks

- Task#5: Harvest Again
 - Load the world named 'harvest2.wld'.
 - Add a robot.
 - Make the robot harvest all the carrots via the shortest path possible.



Comment

- We use *comments* for other humans only inside the program
 - To embed programmer-readable annotations
 - To make the source code easier to understand
- If a line starts with a hash symbol **#**, then this line is a *comment* and will be ignored by the Python interpreter:

```
# My first program
from cs1robots import *
create_world()

# This line should be ignored!
```

Any Questions?
