



Sharing on application of cloud computing services in IT education



IT Innovation Lab in Secondary Schools

中學IT創新實驗室計劃



The Y.W.C.A. Hioe Tjo Yoeng College

Healthy Tenacious Young Caring

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Head, IT in Education Committee**

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The YWCA Hioe Tjo Yoeng College Enriched I.T. Class Programme

<https://www.facebook.com/htyc.eitc/> 



Benefits of using cloud



1. **Quick to deploy** as it is subscription-based
2. **Scalable and flexible** if more students are added
3. **No initial investment of hardware** such as server and subsequent maintenance cost
4. **Increased mobility** – student can learn anywhere



1. Coding Education @HTYC
2. Cloud-based platform
 - a. AWS Educate (K12 Education)
 - b. CodeCombat (Python)
 - c. Replit (Online IDE + LMS)

Junior Form Coding

S1

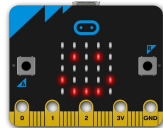
VB(2000-2006)

Scratch

Code.org

Micro:bit

SCRATCH



S2

App Inventor

mBlock



S3

Pascal (2005 - 2019)

Kudo

Java (2016)

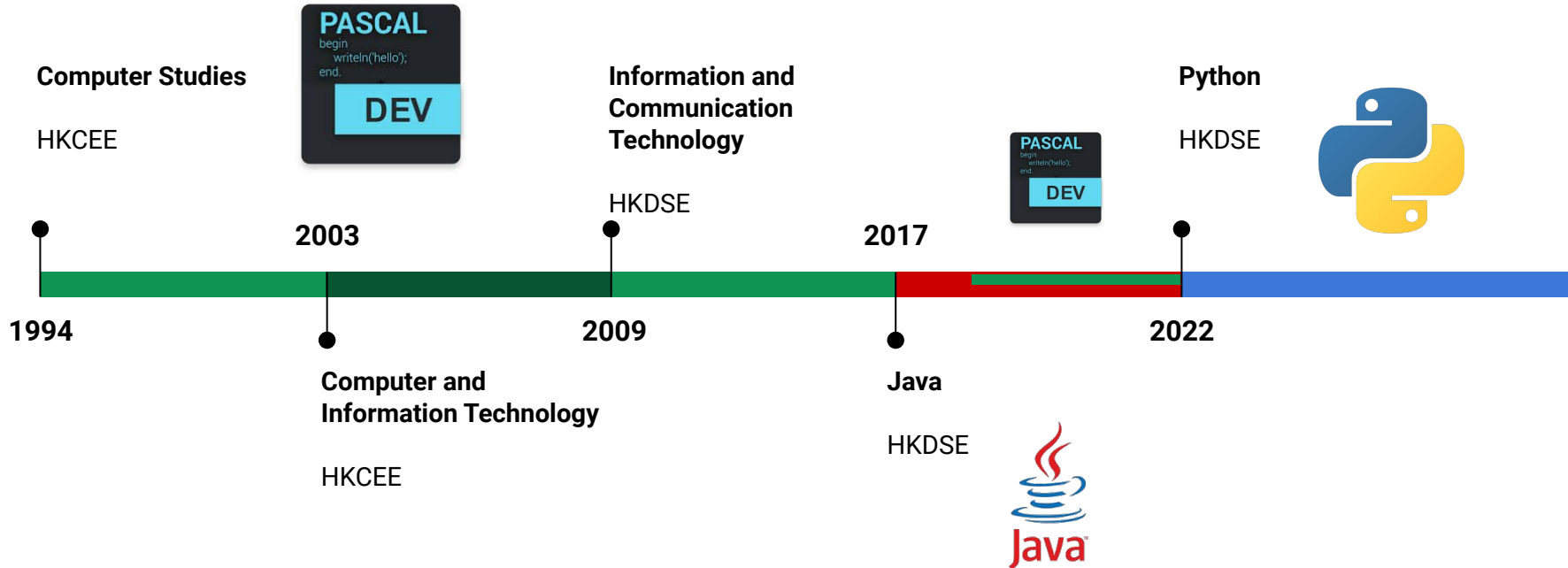
App Inventor

SQL

Python (2020)



Senior Form Coding Curriculum@HTYC



The YWCA Hioe Tjo Yoeng College Enriched I.T. Class Programme

<https://www.facebook.com/htyc.eitc/> 






1. Coding Education @HTYC
2. Cloud-based platform
 - a. AWS Educate (K12 Education)
 - b. CodeCombat (Python)
 - c. Replit (Online IDE + LMS)

AWS K12
Education

aws  **educate**



Our experience in use AWS to teach cloud computing

2019-2020

EITC S3 (30 students)

2020-2021

EITC S3 (30 students)

Why AWS?



1. Device independent
2. Free (K12 Education)
3. Cloud Career Pathways and Badges
4. Topics (Machine Learning)

2. Free to join (K12 account)



hi :)

[SIGN IN](#) 

[Forgot password?](#)

[Not an AWS Educate member? Apply now.](#)

3. Cloud Career Pathways and Badges



Badges

Earn badges (and bragging rights) by completing interactive challenges about the cloud. You can complete the badges in any order. Check out each one to learn more and get started!



Cloud Explorer



Cloud Inventor



Cloud Builder

Which badge is right for me? 🤖

PROGRESS

4/10

Self learning


Cloud Computing

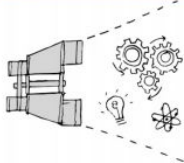
Welcome to AWS Educate's Cloud Challenges!

Click **BEGIN** to learn more about key concepts of cloud computing, such as security, artificial intelligence, and much more!



4. Machine Learning

BadgesMy Backpack**Advanced Learning**AWS AccountClassroomsLogout







Advanced Learning

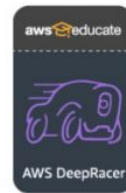
Continue your cloud journey with AWS Educate's advanced Badges and Cloud Career Pathways. Learn key cloud skills and earn completion credentials to show your expertise.

Advanced BadgesCloud Career Pathways

Explore Advanced Badges

Complete badges in some of today's coolest fields to demonstrate your tech know-how.





AWS DeepRacer Badge

In this brief workshop-style badge we will be talking about reinforcement learning, using Amazon Web Services' DeepRacer, a deep-learning-enabled race car. This course will explore

START ▶

Courses

Explore Advanced Badges

Complete badges in some of today's coolest fields to demonstrate your tech know-how.



AWS Startups Badge

Learn about the world of startups by outlining steps necessary to get your idea up and running, as well as highlight AWS services that can make that leap into being a founder much easier.

START ►



Amazon Innovation

Learn how to build skills to amplify innovation around the world using Amazon's unique process and culture of innovation.

START ►



DeepLens Badge

DeepLens is a programmable video camera designed to expand your knowledge of deep learning. Hear directly from experts and complete activities to learn more.

START ►



Amazon Honeycode 101 Badge

Learn about Amazon Honeycode and how it transforms the way teams track and monitor work being done by building your own productivity app.

START ►



AWS DeepRacer Badge

In this brief workshop-style badge we will be talking about reinforcement learning, using Amazon Web Services' DeepRacer, a deep-learning-enabled race car. This course will explore

START ►



Sumerian Badge

Amazon Sumerian is a set of tools for creating high-quality virtual reality (VR) experiences on the web. With Amazon Sumerian, you can construct an interactive 3D scene without any

START ►



Gaming Badge

Take a guided tour of AWS gaming tools through hands-on activities to build a gaming environment, design characters, and more.

START ►



IoT Badge

Explore the world of IoT and the services AWS offers. Learn how the network connectivity of devices we use every day is changing the world around us.

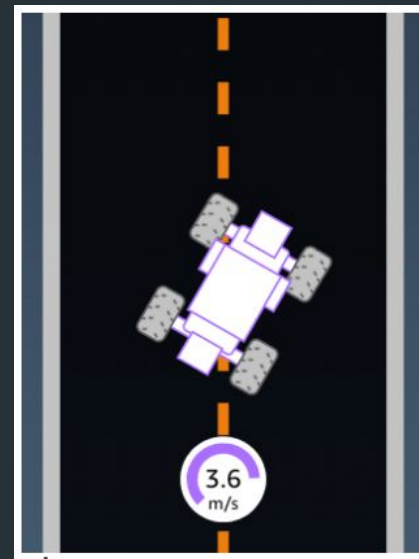
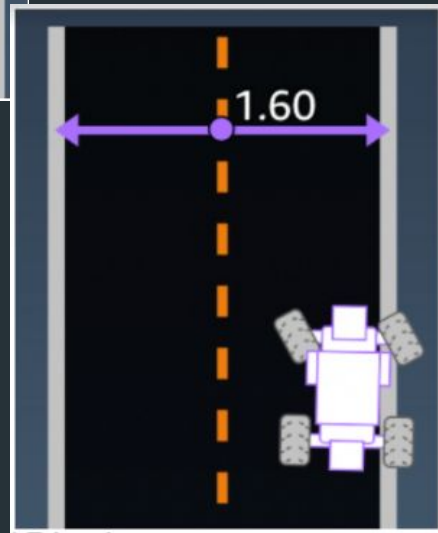
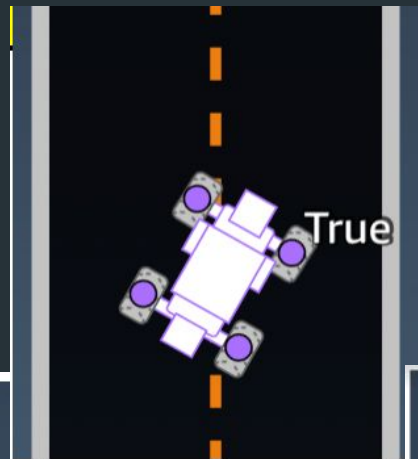
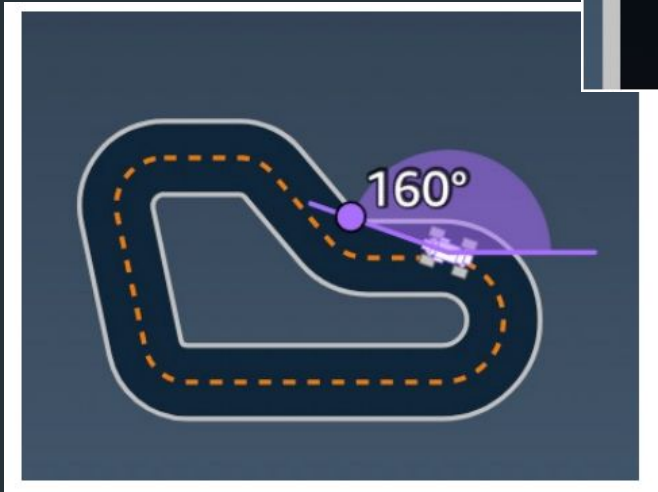
START ►

Deepracer

```
def reward_function(params):  
    #####  
    ...  
    Example of using all_wheels_on_track and speed  
    ...  
  
    # Read input variables  
    all_wheels_on_track = params['all_wheels_on_track']  
    speed = params['speed']  
  
    # Set the speed threshold based your action space  
    SPEED_THRESHOLD = 1.0  
  
    if not all_wheels_on_track:  
        # Penalize if the car goes off track  
        reward = 1e-3  
    elif speed < SPEED_THRESHOLD:  
        # Penalize if the car goes too slow  
        reward = 0.5  
    else:  
        # High reward if the car stays on track and goes fast  
        reward = 1.0  
  
    return reward
```



Deepracer



A. CodeCombat

<https://codecombat.com/>



Our experience in use CodeCombat to teach coding

2019-2020 EITC S2(30 students), S3 (30 students)	CS1, 2, 3, 4
2020-2021 S3 Computer Literacy (120 students)	CS1, 2, (3)
2020-2021 S2 Computer Literacy (120 students)	CS1, 2

Why CodeCombat?

1. Learn Coding (Python)
2. Gamification
3. LMS
4. Competition

CODE COMBAT

BACK TO CLASSROOM

COMPUTER SCIENCE 2
45/45

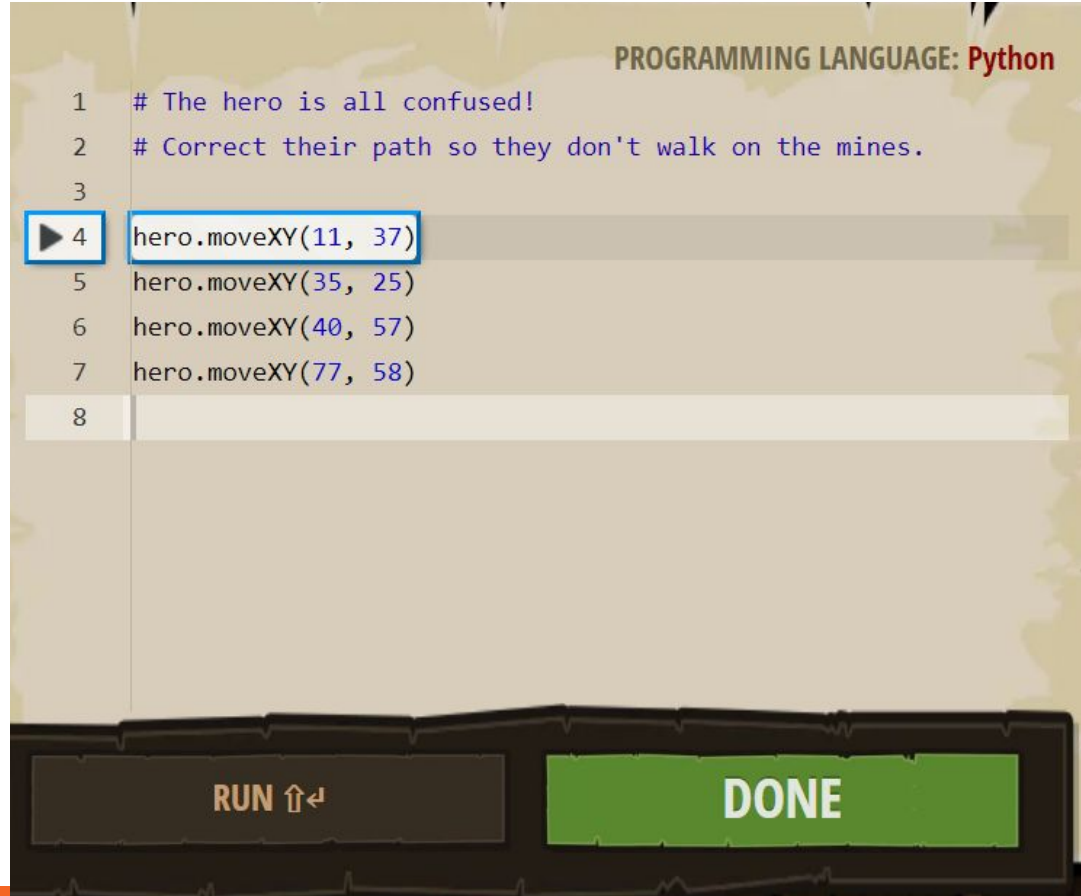
21. STILLNESS IN MOTION

Remain centered with nested if-statements.

PLAY



Object



```
if hero.isReady("cleave"):  
    # First priority is to cleave if it's ready:  
    hero.cleave(enemy)  
    pass  
elif distance < 5:  
    # Attack the nearest munchkin that gets too close:  
    hero.attack(enemy)  
    pass  
else:  
    # Otherwise, try to break open the chest:  
    # Use the name of the chest to attack: "Chest".  
    hero.attack("Chest")  
    pass
```

Nested-if

#19

Function with argument

#33


```
1 # The function maybeBuildTrap defines TWO parameters!
2 def maybeBuildTrap(x, y):
3     # Use x and y as the coordinates to move to.
4     hero.moveXY(x, y)
5     enemy = hero.findNearestEnemy()
6     if enemy:
7         pass
8     # Use buildXY to build a "fire-trap" at the given x and y.
9     hero.buildXY("fire-trap", x, y)
10 while True:
11     # This calls maybeBuildTrap, with the coordinates of the top
12     # entrance.
13     maybeBuildTrap(43, 50)
14     # Now use maybeBuildTrap at the left entrance!
15     maybeBuildTrap(25, 34)
```

While loop

Counting

#1

```
1 # Use a while to loop until you have counted 10 attacks.
2
3 attacks = 0
4 while attacks < 10:
5     # Attack the nearest enemy!
6     enemy = hero.findNearestEnemy()
7     hero.attack(enemy)
8     # Incrementing means to increase by 1.
9     # Increment the `attacks` variable.
10    attacks += 1
11
12 # When you're done, retreat to the ambush point.
13 hero.say("I should retreat!") #Δ Don't just stand there!
14 hero.moveXY(79, 33)
```



Array #13

```
3 # This array is a list of your friends' names.
4 friendNames = ['Joan', 'Ronan', 'Nikita', 'Augustus']
5
6 # Array indices start at 0, not 1!
7 friendIndex = 0
8
9 # Loop over each name in the array.
10 # The len() function gets the length of the list.
11 while friendIndex < len(friendNames):
12     # Use square brackets to get a name from the array.
13     friendName = friendNames[friendIndex]
14
15     # Tell your friend to go home.
16     # Use + to connect two strings.
17     hero.say(friendName + ', go home!')
18
19     # Increment friendIndex to get the next name.
20     friendIndex += 1
```


Find Max

#23

```
5  maxDistance = 0
6  enemyIndex = 0
7  enemies = hero.findEnemies()
8
9  # Look at all the enemies to figure out which one is farthest away.
10 while enemyIndex < len(enemies):
11     target = enemies[enemyIndex]
12     enemyIndex += 1
13
14     # Is this enemy farther than the farthest we've seen so far?
15     distance = hero.distanceTo(target)
16     if distance > maxDistance:
17         maxDistance = distance
18         farthest = target
```



LMS

A good Learning
management system

Current Classes

EITC 2019-2023

Language: Python Students: 28

[view class](#) [edit class settings](#) [archive class](#)

CS1

CS2

CS3

CS4

CS5



Training Class

Language: Python Students: 8

[view class](#) [edit class settings](#) [archive class](#)

CS1

GD1

WD1

CS2

GD2

WD2

CS3

GD3

CS4



CS5

CS6

EITC 2018-2022

Language: Python Students: 30

[view class](#) [edit class settings](#) [archive class](#)

CS1

WD1

CS2

WD2

CS3

CS4

CS5



[About](#)[Parents](#)[Impact](#)[My Teachers](#)[My Classes](#)[My Acco](#)[Students](#)[Course Progress](#)[Assessments](#)[License Status](#)

Select All

☐Sort by: **Name** **Progress**

Select course:

Game Development 1

[Assign Course](#)☐**Casa I**

[redacted]@gmail.co...

Latest completed:

Computer Science 3: Level 6

CS1

WD1

CS2

WD2

CS3

CS4

CS5

☐**Eirc P**

EricHuiHP

Latest completed:

Computer Science 5: Level 5

CS1

WD1

CS2

WD2

CS3

CS4

CS5

☐

[redacted]

[redacted]@sch.htyc.edu.hk

Latest completed:

Computer Science 3: Level 20

CS1

WD1

CS2

WD2

CS3

CS4

CS5

☐

[redacted]

[redacted]@gmail.com

Latest completed:

Computer Science 4: Level 25

CS1

WD1

CS2

WD2

CS3

CS4

CS5

☐

[redacted]

[redacted]@sch.htyc.edu.hk

Latest completed:

Computer Science 3: Level 34

CS1

WD1

CS2

WD2

CS3

CS4

CS5

☐**S3A12**

[redacted]@sch.htyc.edu.hk

Latest completed:

Computer Science 4: Level 20

CS1

WD1

CS2

WD2

CS3

CS4

CS5

☐**S3B03**

[redacted]@sch.htyc.edu.hk

Latest completed:

Web Development 2: Level 3

CS1

WD1

CS2

WD2

CS3

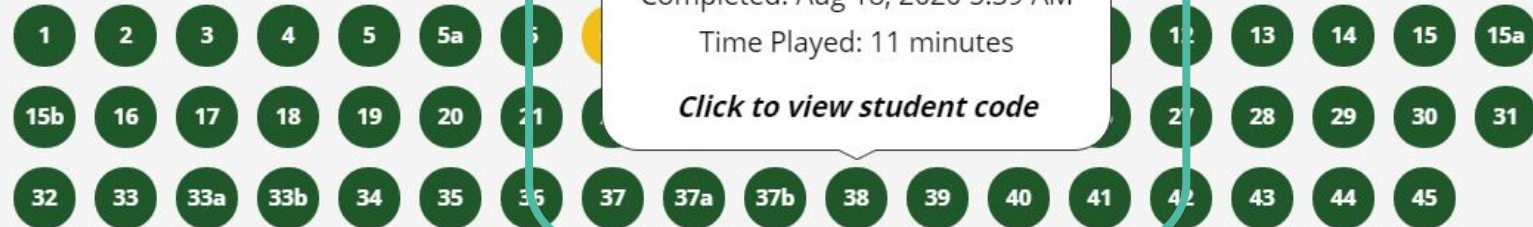
CS4

CS5

Sort by: Name Progress



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Arena

Level: 38. Buddy's Name

Completed: Aug 18, 2020 5:39 AM

Time Played: 11 minutes

Click to view student code



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TEACHER DASHBOARD

[MY TEACHERS](#)[MY CLASSES](#)[COURSE GUIDES](#)[STUDENT LICENSES](#)[RESOURCE HUB](#)[EDUCATOR FAQ](#)

Courses

Review course overviews and levels

Introduction to Computer Science

Learn basic syntax, while loops, and the CodeCombat environment.

Concepts covered: Basic Syntax, Arguments, Strings, While Loops, Variables, Algorithms

[Level Overviews and Solutions — Python](#)[JavaScript](#)[C++](#)

Select language:

Python ▾

Select level:

1. Dungeons of Kithgar ▾

Play Level

Default Code

```
# This function attacks the nearest enemy.
def findAndAttackEnemy():
    enemy = hero.findNearestEnemy()
    if enemy:
        hero.attack(enemy)

# Define a function to cleave enemies (but only when the ability is ready).
def findAndCleaveEnemy():
    # Find the nearest enemy:
    enemy = hero.findNearestEnemy()
    # If an enemy exists:

    # And if "cleave" is ready:

    # It's time to cleave!

pass

# In your main loop, patrol, cleave, and attack.
while True:
    # Move to the patrol point, cleave, and attack.
    hero.moveXY(35, 34)
    findAndCleaveEnemy()
    findAndAttackEnemy()

    # Move to the other point:

    # Use findAndCleaveEnemy function:

    # Use findAndAttackEnemy function:
```

Overview

In this level you'll be writing the *definition* of a function so that you can *call* it in your main loop. Because the Ogres might attack in larger waves, you'll need to add a function that uses your Cleave ability.

When you define your `findAndCleaveEnemy` function, remember to check that: 1. the enemy exists; and 2. that your Cleave ability is ready to use.

Be sure to remember how to define a function:

```
def sayHello():
    hero.say('Hello!')
```

Remember that when you call a function you *don't* add `hero` to it, because the function is defined by *you*, not the hero.

```
sayHello()
hero.say('Goodbye.')
```

Gamification

Motivation



Arena



Arena

Battle your classmates while gobbling up gems! Use your programming skills and creative thinking to gain an edge over your friends.

PLAY AS HUMANS

PLAY AS OGRES

SPECTATE








Ladder

My Matches

5 players in league

2 players in league

Humans Leaderboard					
	Score	Name	When		👁
	1	3011	Shaman CPU	5 years ago	Fight!
	2	2832	Chieftain CPU	5 years ago	Fight!
	3	2313	Simple CPU	5 years ago	Fight!
	4	2181	Brawler CPU	5 years ago	Fight!
	5	1878	Thoktar CPU	5 years ago	Fight!
	6	1524	JerryLMH	5 months ago	Fight!
	7	1488	Walter41	5 months ago	Fight!
	8	1000	Johnsonmoney	5 months ago	Fight!
	9	1000	RickyChem	5 months ago	Fight!
	10	642	Nelson Chun	4 months ago	Fight!

Ogres Leaderboard					
	Score	Name	When		👁
	1	3007	Shaman CPU	5 years ago	Fight!
	2	2620	Chieftain CPU	5 years ago	Fight!
	3	2540	Brawler CPU	5 years ago	Fight!
	4	2112	Thoktar CPU	5 years ago	Fight!
	5	1964	Simple CPU	5 years ago	Fight!
	6	1537	EricHuiHP	3 months ago	Fight!
	7	384	JohnsonTse	5 months ago	Fight!

More

Competition

- 3,000+ Students from Hong Kong & Macau
- 150 Schools and Coding Academies
- 300,000+ Lines of code written
- 50+ Students nominated to the Global Final






Instant IDE

Code from your browser.

Start coding instantly, right from your browser. With GitHub integration and support for nearly every major programming language, Repl.it is the best place to code.

<> Start coding

<https://replit.com/>



Our experience in use AWS to teach cloud computing

2020-2021 EITC S4 (30 students)

2020-2021 S4 ICT (30 students)

Why replit?

1. In-browser IDE (Code, create, and learn together)
2. LMS features
3. Real time collaboration
4. Classroom management



In-browser IDE

The screenshot shows an in-browser IDE interface. At the top, there is a header bar with a hamburger menu, a logo, a user profile icon, and the text "20202023ICTBlo1 / 00 Assignment/8.2.5 ...". To the right of the header bar, there are two buttons: "Run" (with a green play icon) and "Resubmit" (with a speech bubble icon). Both buttons are circled in red. Below the header bar, the interface is divided into three main sections. The left section is a "Files" sidebar showing a list of files: "main.py" (selected), "ans.py", and "readme.md". The middle section is a code editor displaying the content of "main.py". The code is a Python script that reads an array of integers from a single line of input, finds the maximum element and its index, and prints them. The code is as follows:

```
1 # read an array of integers from single line of
  input in python3 (out of syllabus)
2
3 numlist = list(map(int, input().split()))
4
5 print(numlist)
6 print("length of the list is ", len(numlist))
7
8 # size is used to store the number of element in
  array numlist
9 size = len(numlist)
10
11 # write you code below
12 maxIndex = 0
13 max = numlist[0]
14
15 for i in range(1, size):
16     if numlist[i] > max:
17         max = numlist[i]
18         maxIndex = i
19
20 print('Max index: ', maxIndex)
21 print('Max value: ', max)
```

The right section is a panel with three tabs: "Console", "Shell", and "Markdown". The "Markdown" tab is active, showing a preview of a document titled "Statement". The document contains the following text:

Statement

Given a list of integers, find the first maximum element in it. Print its value and its index (counting with 0).

Example input

```
1 2 3 2 1
```

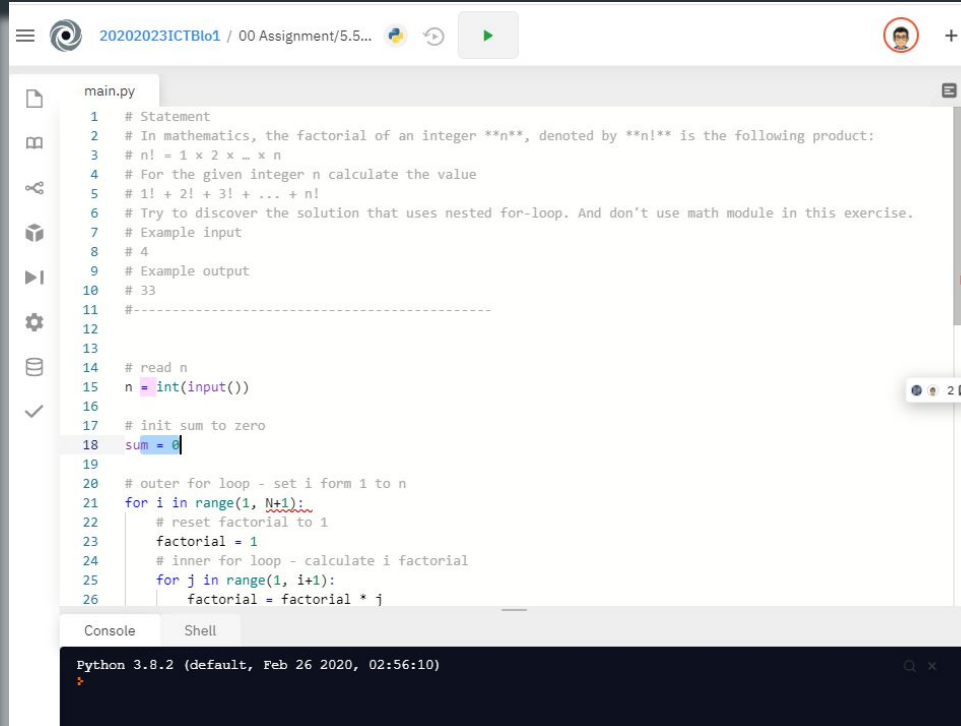
Example output

```
Max index: 2
Max value: 3
```

- Drop into any student repl in **real-time**.
- Review students' work, **send instant feedback** without leaving the IDE
- Conversations and **real feedback**
- **Tests** and autograding



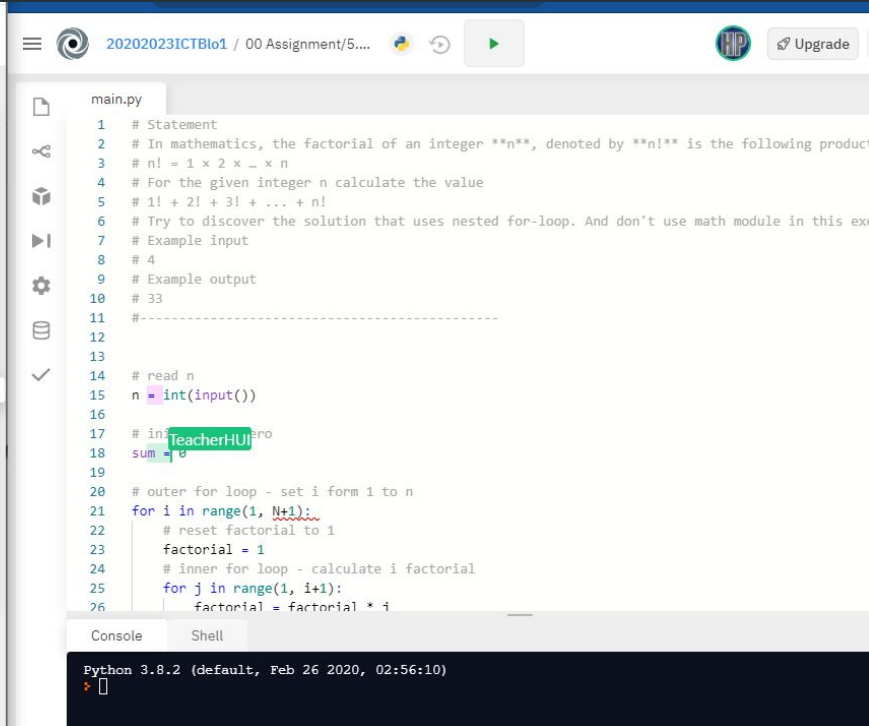
Instant Feedback



```
1 # Statement
2 # In mathematics, the factorial of an integer **, denoted by **n!** is the following product:
3 # n! = 1 x 2 x ... x n
4 # For the given integer n calculate the value
5 # 1! + 2! + 3! + ... + n!
6 # Try to discover the solution that uses nested for-loop. And don't use math module in this exercise.
7 # Example input
8 # 4
9 # Example output
10 # 33
11 #-----
12
13
14 # read n
15 n = int(input())
16
17 # init sum to zero
18 sum = 0
19
20 # outer for loop - set i form 1 to n
21 for i in range(1, N+1):
22     # reset factorial to 1
23     factorial = 1
24     # inner for loop - calculate i factorial
25     for j in range(1, i+1):
26         factorial = factorial * j
```

Console Shell

Python 3.8.2 (default, Feb 26 2020, 02:56:10)



```
1 # Statement
2 # In mathematics, the factorial of an integer **, denoted by **n!** is the following product
3 # n! = 1 x 2 x ... x n
4 # For the given integer n calculate the value
5 # 1! + 2! + 3! + ... + n!
6 # Try to discover the solution that uses nested for-loop. And don't use math module in this exe
7 # Example input
8 # 4
9 # Example output
10 # 33
11 #-----
12
13
14 # read n
15 n = int(input())
16
17 # in TeacherHUI pro
18 sum = 0
19
20 # outer for loop - set i form 1 to n
21 for i in range(1, N+1):
22     # reset factorial to 1
23     factorial = 1
24     # inner for loop - calculate i factorial
25     for j in range(1, i+1):
26         factorial = factorial * i
```

Console Shell

Python 3.8.2 (default, Feb 26 2020, 02:56:10)

LMS (Teams)

The screenshot displays the Microsoft Teams web interface. On the left is a sidebar with navigation icons and labels: Home, My repls, Talk, Notifications, Languages, Templates, Tutorials, Teams (highlighted with a 'BETA' badge), and Help and Resources. The top of the interface features a search bar with the placeholder text 'Search and run commands' and a keyboard shortcut 'Ctrl+'. The main content area is divided into three sections: 'Teams' with a '+ Create a team' button and a 'Give us feedback!' link; 'Friends' with a description 'Teams for Friends is a place for friends to collaborate on shared repls.' and a 'Learn more' link; and 'Education' which lists two 'Teams for Education Subscription' items. Each subscription entry shows a renewal date of '2/6/2021' and a list of members with their avatars and a count (e.g., '+11' and '+15').

Navigation sidebar:

- Home
- My repls
- Talk
- Notifications
- Languages
- Templates
- Tutorials
- Teams** BETA
- Help and Resources

Top bar:

> Search and run commands Ctrl+.

Teams + Create a team Give us feedback!

Friends

Teams for Friends is a place for friends to collaborate on shared repls.
[Learn more](#)

Education

Teams for Education Subscription
Renewal date: 2/6/2021

ICT Block 1 (2020-2023) +11

























Teams for Education Subscription
Renewal date: 2/6/2021

ICT Block 2 (2020-2023) +15

LMS (Review students' work)

Submissions

Filter: Started

Authors	Started date	Submitted date	Last Reviewed	Actions
 4B17 Law Sau Ho Handsome_boy52	2/2/2021 11:16 AM	2/2/2021 11:32 AM	—	View Repl 
 S4B16	2/2/2021 11:16 AM	—	—	View Repl 
 S4B12 FU	2/2/2021 11:17 AM	2/2/2021 11:24 AM	—	View Repl 
 Eric Hui	2/2/2021 11:17 AM	—	—	View Repl 
 S4B10 CHUNG	2/2/2021 11:17 AM	2/2/2021 11:24 AM	—	View Repl 
 S4C07 CHEUNG	2/2/2021 11:17 AM	2/2/2021 11:28 AM	—	View Repl 
 S4B25 POON	2/2/2021 11:17 AM	—	—	View Repl 
 S4A10 LEUNG	2/2/2021 11:17 AM	2/2/2021 11:26 AM	—	View Repl 
 4B 05	2/2/2021 11:21 AM	2/2/2021 11:24 AM	—	View Repl 
 S4A19 NgKaShuen	2/2/2021 11:23 AM	2/2/2021 11:26 AM	—	View Repl 
 S4A04 HO	2/2/2021 11:25 AM	—	—	View Repl 
 S4C22 SHIU	2/2/2021 11:25 AM	—	—	View Repl 

Create a project

Language ▼

Title

Description

Group project:



This project is only accessible by team admins until it is published.

Create

Create Assignment

Pre-set Test cases

The screenshot displays a web-based programming environment. The top navigation bar includes a hamburger menu, a logo, a user profile icon, and the text "20202023ICTBlo1 / 00 Assignment/5.5 N...". To the right are icons for Python and a refresh button. A left sidebar contains icons for file management, sharing, a 3D cube, a play button, settings, a database, and a checked checkbox. The main area is titled "Input/Output Tests" with a "BETA" badge. It features two buttons: "+ Create test" and "▶ Run tests". Below these are three input fields with the values 4, 6, and 8, each accompanied by edit and delete icons. On the right, a code editor shows the file "main.py" with the following Python code:

```
1 # Statement
2 # In mathematics, the
3 #  $n! = 1 \times 2 \times \dots \times n$ 
4 # For the given integer
5 #  $1! + 2! + 3! + \dots +$ 
6 # Try to discover the
7 # Example input
8 # 4
9 # Example output
10 # 33
11 #-----
12
13
14 # read n
15
16
17 # init sum to zero
18
19
20 # enter for loop set
```


Conversations and real feedback

```
12
13
14 # read n
15 n = int(input())
16
17 # init sum to zero
18 sum = 0
19
20 # outer for loop - set i form 1 to n
21 for i in range(1, N+1):
```

Console

Shell



TeacherHUI 1d

missing a = sign

EricHui 1d

done

Reply to @EricHui



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