

Python & Java {4} Teachers



Veden kiertokulku

Level 2- Python



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Johdanto

Kaikki maapallon nykyinen vesi on ollut olemassa jo elämän synnyttyä planeetallamme. Jok'ikinen vesipisara- ja molekyyli on siis tehnyt lukemattomia maailmanympärimatkoja.

Missä kaikkialla vesi siis kulkee ennen kuin se saavuttaa vesihanamme? Miten vettä maapallomme käyttää vettä jatkuvasti uudelleen kuljettaen sitä ympäri maailmaa?





Some ice evaporates directly into the air, skipping the melting phase (sublimation).



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Tehtävä. Kirjoita, mitä vedelle tapahtuu vihreissä nuolissa .

Pilvi

Tulivuori

Mäki

Sumu

Järvi

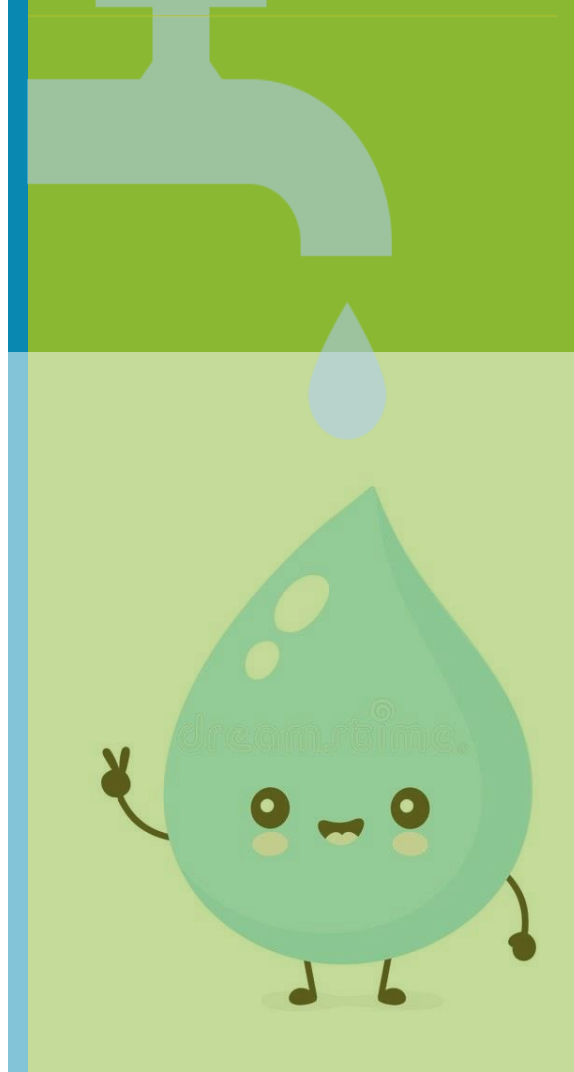
Puu

Meri

Maaperä



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Tehtävä

- Tehtävänäsi on luoda tekstiseikkailupeli vesipisaran matkasta kiertokulun eri vaiheissa käyttämällä python-kielen IF-lausekkeita.

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Prosessi

Ohjelman pitäisi

- ✓Esittää käyttäjälle kysymyksiä, joiden perusteella vesipisaran matkasta tulee yksilöllinen käyttäjän määrittämien vaihtoehtojen mukaan.
- ✓Antaa käyttäjälle mahdollisuuden toistaa kysymykset, kun vesipisara on palannut takaisin pilveen.



Aliohjelmat (subroutines)

Aliohjelmat ovat koodilohkoja eli ohjelman käskyjä, mitkä toteuttavat tiettyjä asioita.

- Ne ovat pienoishjelmia ison ohjelman sisällä.
- Niissä on koodirivejä, jotka tekevät aiemmin määrättyjä asioita.
- Jos näitä samoja asioita käytetään useasti, ne kannattaa kirjoittaa aliohjelmaksi.
- Jokaiselle aliohjelmalle annetaan oma kuvaava nimi, jotta sitä on helppo kutsua koodista.
- Aliohjelmat lyhentävät koodin pituutta, mutta myös tekevät ne loogisemmaksi ja helpommaksi lukea ja ylläpitää.

```
#Defining a subroutine:  
def nameOfSubroutine():  
    code goes here  
#Calling a subroutine:  
nameOfSubroutine()
```

```
1 def nameOfSubroutine(): #declaring  
2     print("hello")  
3 nameOfSubroutine()      #calling  
4
```

1. askel

Tee ja määrittele aliohjelma

Aliohjelmat määritellään def()-käskyllä.

```
1 def textAdventure():  
2     print("\nIt sure is getting cold in this cloud!")
```

Huomaa: \n tarkoittaa uutta riviä eli rivinvahtoa. Käytä sitä, jotta saat pelistäsi kauniimman näköisen.



2. askel

Kutsu aliohjelmaa

Kuten rivinnumeroista huomaat, aliohjelmaan kirjoitetaan vielä paljon koodia. Kuitenkin tässä vaiheessa harjoittelemme aliohjelman kutsumista, joten koodissa on nyt paljon tyhjää.

```
53 #main program
54 print("Welcome to life in the water cycle!")
55 print("You are a water droplet")
56 print("Throughout the game, you will be asked to chose your path in the story and explore the wonderful water cycle")
57 print("Time for your first choice...")
58
59 textAdventure()
60
```

Keksi ja kirjoita peliisi hyvä taustatarina, eli mitä on tähän mennessä tapahtunut.



Silmukat

Silmukka on koodilohko, jota toistetaan, kunnes silmukassa esitetty ehto toteutuu.

Python-kielessä on kaksi perussilmukkatyyppiä. WHILE-silmukat (niitä on tässä ohjelmassa) ja FOR-silmukat.

WHILE-silmukan päättymistä tutkii ehtolause (condition). Silmukkaa toistetaan, kunnes ehto on epätosi (FALSE).

```
1
2 condition = True
3 while condition:
4     print("Repeating...")
5
6     print("Finish loop?")
7     finished = input()
8
9
10    if finished == "Y":
11        condition = False
12
```

```
Repeating...
Finish loop?
N
Repeating...
Finish loop?
N
Repeating...
Finish loop?
N
Repeating...
Finish loop?
Y
```

FOR-silmukoita toistetaan jonkun lukumäärän verran.

```
for i in range(5):
    print(i)
```

```
0
1
2
3
4
```

3. askel

Kutsu aliohjelmaa

Niin kauan kuin silmukan ehtolauseke on totta, silmukassa oleva koodipätkä kysyy käyttäjältä, jos tämä haluaa jatkaa peliä. Jos hän haluaa, ohjelma kutsuu aiemmin tehtyä aliohjelmaamme, joka tulostaa ruudulle ohjeita.

```
61 continueGame=True
62 while continueGame==True:
63     repeat=input("\nWould you like to play the game again to explore different choices? (yes or no)")
64     if repeat=="yes":
65         textAdventure()
66     else:
67         continueGame=False
68         print("\nThank you for playing!")
69
```

WHILE-silmukan päättymisehdossa oleva muuttujaa muutetaan epätodeksi, jos pelaaja ei halua jatkaa peliä.



IF-lausekkeet

```
if character in alphabet:  
    print ("the character is in the alphabet")  
else:  
    print ("the character is NOT in the alphabet")
```

IF-lauseke haarauttaa ohjelman kulkua eri suuntiin riippuen IF-lauseissa olevista ehdoista.

IF-lauseke suorittaa tietyn koodinpätkän, jos ehto on tosi (TRUE), tai ELSE-osion, jos se on epätosi (FALSE).

Sisäkkäiset ehtolausekkeet

```
1 if letter=="abc":
2
3     if letter2=="def":
4
5         if letter3=="ghi":
6
7             if letter4=="jkl":
8
9                 else:
10
11             else:
12
13         else:
14
15             if letter5=="ghi":
16
17                 if letter6=="jkl":
18
19                     else:
20
21                 else:
22
23                     if letter7=="jkl":
24
25                         else:
26
27     else:
28         if letter8=="def":
29
30             if letter9=="ghi":
31
32                 if letter10=="jkl":
33
34                     else:
35
36                 else:
37
38             else:
39
40                 if letter11=="ghi":
41
42                     if letter12=="jkl":
43
44                         else:
45
46                     else:
47
48                         if letter13=="jkl":
49
50                             else:
```

Ehtolausekkeitä voidaan laittaa sisätysten, eli riippuen lopullisia vaihtoehtoja voi olla hyvinkin paljon. Toisaalta, ohjelmasta tulee melko monimutkainen, varsinkin jos sisäkkäisiä ehtolausekkeitä on hirveästi.

Sisäkkäiset ehtolausekkeet näyttävät koodissa kuin nuolilta.

Muista: On todella helppo mennä sekaisin sisäkkäisissä ehtolausekkeissa. Ole tarkkana vastaavien ELSE-lausekkeiden kanssa.



Vieressä oleva koodin pätkä on hyvä aloitus omalle seikkailupelillesi. Älä tee siitä liian monimutkaista.

4. askel

Tarina

Klikkaa suuretaaksesi

```

1 def textAdventure():
2     print("It's sure is getting cold in this cloud!")
3     userChoice=input("Which form of precipitation would you like to take? (rain OR snow)")
4     if userChoice=="rain":
5         userChoice=input("Where would you like to fall down? (lake OR tree)")
6         if userChoice=="lake":
7             userChoice=input("Look at all the fish in this lake! What now? (chill OR travel down)")
8             if userChoice=="chill":
9                 userChoice=input("You have decided to wait around. The temperature has started to rise and you feel full of energy. What now? (fly OR fog)")
10            if userChoice=="fly":
11                print("You have chosen to evaporate. You soar through the sky and condense and cool to once again form a part of the cloud")
12            else:
13                print("You are now fog on the surface of the ground")
14                print("You see that the sun is rising again and so are you until you condense and cool to once again form a part of the cloud")
15        else:
16            userChoice=input("as you move closer top the bottom of the lake, you see soil and decide to infiltrate. What now? (find roots OR find sea)")
17            if userChoice=="find roots":
18                print("You have found the roots of a tree. You are taken by the root hair cells and travel to the leaves until you leave the surface")
19                print("You are now water vapor and are free to move around and do so until you condense and cool to once again form a part of the cloud")
20            else:
21                print("After finding the sea, you become a part of a large body of water and see beautiful marine life on your travels")
22                print("You spend hundreds of years here until you evaporate, condense and cool to once again form a part of the cloud")
23        else:
24            userChoice=input("Look at all the leaves on this tree (chill OR travel down)")
25            if userChoice=="chill":
26                userChoice=input("You have decided to wait around. The temperature has started to rise and you feel full of energy. What now? (fly OR fog)")
27            if userChoice=="fly":
28                print("You have chosen to evaporate. You soar through the sky and condense and cool to once again form a part of the cloud")
29            else:
30                print("You are now fog on the surface of the ground")
31                print("You see that the sun is rising again and so are you until you condense and cool to once again form a part of the cloud")
32        else:
33            print("as you move closer to the roots of the tree, you see soil and decide to infiltrate and eventually stumble across the sea during groundwater flow")
34            print("After finding the sea, you become a part of a large body of water and see beautiful marine life on your travels")
35            print("You spend hundreds of years here until you evaporate, condense and cool to once again form a part of the cloud")
36    else:
37        print("You explore the wonders of the coldest parts of the world and see many new animals and forms of wildlife")
38        print("It's sure is a bit cold here until you evaporate, condense and cool to once again form a part of the cloud")
39        print("You hang around until you evaporate, condense and cool to once again form a part of the cloud")

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Tässä esitetyssä tarinassa on melko paljon toistoa, ja monet sen haarat ovat samankaltaisia. Ole kekseliäämpi ja haasta pelaaja.

```
def textAdventure():
    print("\nIt sure is getting cold in this cloud!")
    userChoice1=input("Which form of precipitation would you like to take? (rain OR snow)")
    if userChoice1=="rain":
        userChoice2=input("Where would you like to fall down? (lake OR tree)")

        if userChoice2=="lake":
            userChoice3=input("Look at all the fish in this lake! What now? (fly OR fog)")

            if userChoice3=="chill":
                userChoice4=input("You have decided to wait around. The temperature has started to rise and you feel full of energy")

                if userChoice4=="fly":
                    print("You have chosen to evaporate. You soar through the sky and condense and cool to once again form a part of the cloud")

                else:
                    print("You are now fog on the surface of the ground")
                    print("You see that the sun is rising again and so are you until you condense and cool to once again form a part of the cloud")

            else:
                userChoice4=input("as you move closer top the bottom of the lake, you see soil and decide to infiltrate and eventually turn into water")

                if userChoice4=="find roots":
                    print("You have found the roots of a tree. You are taken down to the ground and see beautiful wildlife")
                    print("You are now water vapor and are free to move around")

                else:
                    print("After finding the sea, you become a part of a large body of water and see beautiful marine life on your way")
                    print("You spend hundreds of years here until you evaporate, condense and cool to once again form a part of the cloud")

        else:
            userChoice3=input("Look at all the leaves on this tree (chill OR travel down)")
            if userChoice3=="chill":
                userChoice4=input("You have decided to wait around. The temperature has started to rise and you feel full of energy")

                if userChoice4=="fly":
                    print("You have chosen to evaporate. You soar through the sky and condense and cool to once again form a part of the cloud")

                else:
                    print("You are now fog on the surface of the ground")
                    print("You see that the sun is rising again and so are you until you condense and cool to once again form a part of the cloud")

            else:
                print("as you move closer to the roots of the tree, you see soil and decide to infiltrate and eventually turn into water")
                print("After finding the sea, you become a part of a large body of water and see beautiful marine life on your way")
                print("You spend hundreds of years here until you evaporate, condense and cool to once again form a part of the cloud")

    else:
        print("You explore the wonders of the coldest parts of the world and see many new animals and forms of wildlife")
        print("It may be a long time before you have the energy to melt and then vaporise")
        print("You hang around until you evaporate, condense and cool to once again form a part of the cloud")
```



Miltä koodin pitäisi näyttää...

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Siinäpä on
paljon koodia.
Tarkista usein
ja aja
ohjelmaasi
kirjoittaessasi
tä.

```
1 def textAdventure():
2     print("\nIt sure is getting cold in this cloud!")
3     userChoice1=input("Which form of precipitation would you like to take? (rain OR snow)")
4     if userChoice1=="rain":
5         userChoice2=input("Where would you like to fall down? (lake OR tree)")
6
7     if userChoice2=="lake":
8         userChoice3=input("Look at all the fish in this lake! What now? (chill OR travel down)")
9
10    if userChoice3=="chill":
11        userChoice4=input("You have decided to wait around. The temperature has started to rise and you feel full of energy. What now? (fly OR fog)")
12
13    if userChoice4=="fly":
14        print("You have chosen to evaporate. You soar through the sky and condense and cool to once again form a part of the cloud")
15
16    else:
17        print("You are now fog on the surface of the ground")
18        print("You see that the sun is rising again and so are you until you condense and cool to once again form a part of the cloud")
19
20    else:
21        userChoice4=input("as you move closer top the bottom of the lake, you see soil and decide to infiltrate. What now? (find roots OR find sea)")
22
23    if userChoice4=="find roots":
24        print("You have found the roots of a tree. You are taken up by the root hair cells and travel to the leaves until you leave the surface")
25        print("You are now water vapor and are free to move around and do so ntil you condense and cool to once again form a part of the cloud")
26
27    else:
28        print("After finding the sea, you become a part of a large body of water and see beautiful marine life on your travels")
29        print("You spend hundreds of years here until you evaporate, condense and cool to once again form a part of the cloud")
30
31    else:
32        userChoice3=input("Look at all the leaves on this tree (chill OR travel down)")
33        if userChoice3=="chill":
34            userChoice4=input("You have decided to wait around. The temperature has started to rise and you feel full of energy. What now? (fly OR fog)")
35
36        if userChoice4=="fly":
37            print("You have chosen to evaporate. You soar through the sky and condense and cool to once again form a part of the cloud")
38
39        else:
40            print("You are now fog on the surface of the ground")
41            print("You see that the sun is rising again and so are you until you condense and cool to once again form a part of the cloud")
42
43    else:
44        print("as you move closer to the roots of the tree, you see soil and decide to infiltrate and eventually stumble across the sea during groundwater flow")
45        print("After finding the sea, you become a part of a large body of water and see beautiful marine life on your travels")
46        print("You spend hundreds of years here until you evaporate, condense and cool to once again form a part of the cloud")
47
48    else:
49        print("You explore the wonders of the coldest parts of the world and see many new animals and forms of wildlife")
50        print("It may be a long time before you have the energy to melt and then vaporise")
51        print("You hang around until you evaporate, condense and cool to once again form a part of the cloud")
52
53 #main program
54 print("Welcome to life in the water cycle!")
55 print("You are a water droplet")
56 print("Throughout the game, you will be asked to chose your path in the story and explore the wonderful water cycle")
57 print("Time for your first choice...")
58
59 textAdventure()
60
61 continueGame=True
62 while continueGame==True:
63     repeat=input("\nWould you like to play the game again to explore different choices? (yes or no)")
64     if repeat=="yes":
65         textAdventure()
66     else:
67         continueGame=False
68         print("\nThank you for playing!")
69
70
```

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```
Welcome to life in the water cycle!
You are a water droplet
Throughout the game, you will be asked to chose your path in the story and explore the wonderful water cycle
Time for your first choice...

It sure is getting cold in this cloud!
Which form of precipitation would you like to take? (rain OR snow)rain
Where would you like to fall down? (lake OR tree)lake
Look at all the fish in this lake! What now? (chill OR travel down)chill
as you move closer top the bottom of the lake, you see soil and decide to infiltrate. What now? (find roots OR find sea)find roots
You have found the roots of a tree. You are taken up by the root hair cells and travel to the leaves until you leave the surface
You are now water vapor and are free to move around and do so ntil you condense and cool to once again form a part of the cloud

Would you like to play the game again to explore different choices? (yes or no)yes

It sure is getting cold in this cloud!
Which form of precipitation would you like to take? (rain OR snow)snow
You explore the wonders of the coldest parts of the world and see many new animals and forms of wildlife
It may be a long time before you have the energy to melt and then vaporise
You hang around until you evaporate, condense and cool to once again form a part of the cloud

Would you like to play the game again to explore different choices? (yes or no)yes

It sure is getting cold in this cloud!
Which form of precipitation would you like to take? (rain OR snow)rain
Where would you like to fall down? (lake OR tree)tree
Look at all the leaves on this tree (chill OR travel down)travel down
as you move closer to the roots of the tree, you see soil and decide to infiltrate and eventually stumble across the sea during groundwater flow
After finding the sea, you become a part of a large body of water and see beautiful marine life on your travels
You spend hundreds of years here until you evaporate, condense and cool to once again form a part of the cloud

Would you like to play the game again to explore different choices? (yes or no)no

Thank you for playing!
>>>
```

Conclusion

Sinun pitäisi osata

- ✓Osaat käyttää IF-lausekkeita sujuvasti.
- ✓Osaat luoda proseduureja ja aliohjelmia
- ✓Osaat käyttää WHILE-silmukkaa
- ✓Käytät sujuvasti tulosta- ja syöte-funktioita (print ja input)
- ✓Osaat nimetä muuttujat sopivilla nimillä, jotka ovat järkeviä koodissa.



Arkipäivän elämässä

Peli - Ympäristö

Pelaa - muokkaa koodia
ja tee siitä hauska
vuorovaikutteinen peli
kavereillesi.

Ympäristö - Lisää
tietoa luonnon omasta
kierrätyksestä

Water cycle info:

- <https://www.usgs.gov/media/images/water-cycle-schools>

Online, more complicated version of a text adventure game

- <https://eblong.com/zarf/zweb/dreamhold/>



Onnittelut

Olet tehnyt tekstiseikkailupelin!



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