

Programming

Lab Sessions

Assignment II - Presentations

- Zoom room for presentations:
Meeting ID: 641 7002 9853
Passcode: 034035
- Group order for presentation available at marcomarinho.com
- **Be on time**
- Martin will be available to solve doubts at the usual meeting room with an exercise list.

Assignments Errata

- Assignment 2: Description of task 3 was updated and formula corrected, should be clearer.
- Assignment 3: Chicken protein count on the table was wrong, should be 3 l g. Adjustments to the category names.

Resources

- Slides for this lecture and the solutions for the first exercise list are available at marcomarinho.com.

DET ÄR MATEMATIKFRI FREDAG MINA BEKANTA



Functions

- Divide and conquer
- Split a larger program into sub programs

Example

- Let us use functions to write a program that draws a rectangular frame on the screen, using + for corners, - for the top and bottom and | for the sides.



Example

```
#Function to draw the top and the bottom of the frame
```

```
def drawTopBottom(length):  
    print('+', end='')  
    for i in range(length-2):  
        print('-', end='')  
    print('+', end='')  
    print('')
```

```
#Function to draw the sides of the frame
```

```
def drawSide(length):  
    print('|', end='')  
    for i in range(length-2):  
        print(' ', end='')  
    print('|', end='')  
    print('')
```

```
#Function to draw the complete rectangle
```

```
def drawRectangle(height, width):  
    drawTopBottom(width)  
    for i in range(height-2):  
        drawSide(width)  
    drawTopBottom(width)
```

```
#Draw the rectangle
```

```
drawRectangle(10,10)
```


Example

- Let's write a program where the user has three tries to guess a number between 1 and 10

Example

```
#import the random module
import random

#computer choses a number between 1 and 10
n = random.randint(1, 10)

#three tries for the user to choose the right number
for i in range(3):
    x = int(input("Chose a number between 1 and 10: "))
    #if the number is right, win and break
    if (x == n):
        print("You got it right!")
        break
    else:
        print("You are wrong.")

#if the user loses, tell him what the number was
print('You lose, the number was', n)
```

Example

- Let's write a program where the user can play a dice game. The player throws a pair of dice. If the sum of the values is equal to 7 or 11 at the first throw, he wins. If the sum is 2, 3 or 12 at the first throw, he loses. If the number is 4, 5, 6, 8, 9 or 10, that is his sweet spot. If he has a sweet spot, he must throw the dice again until he scores the value, however, if at any point the scores a 7, he loses.

Example

```
import random

#Function to throw two dice
def throwDice():
    roll_1 = random.randint(1,6)
    roll_2 = random.randint(1,6)
    total = roll_1+roll_2
    print('You have rolled', roll_1, 'and', roll_2)
    print('The total roll is', total)
    return total

#The first throw of the game
def firstThrow(roll):
    if roll == 7 or roll == 11:
        print('You win')
        return 100
    elif roll == 2 or roll == 3 or roll == 13:
        print('You lose')
        return 100
    else:
        sweetspot = roll
        return sweetspot

#The second throw of the game
def otherThrows(roll, sweetspot):
    if roll == 7:
        print('You lose')
        return 100
    if roll == sweetspot:
        print('You win')
        return 100
    else:
        return 0
```

Example

```
#Use the functions to play the game
input('Press enter to throw the dice')
first_roll = throwDice()
last_roll = firstThrow(first_roll)
sweet_spot = last_roll
print('Your sweet spot is', sweet_spot)
print('')
while last_roll != 100:
    input('Press enter to throw the dice')
    last_roll = otherThrows(throwDice(),
sweet_spot)
    print('')
```

Exercise

- Try to write a program where the user can play rock paper scissors against the computer. The first one to get 5 points wins the game.

Exercise

```
import random

#Function to get the play of the computer opponent
def getComputerAction():
    action = random.randint(1,3)
    return action

#Function to ask the user for his action
def getUserAction():
    print('[1] Rock')
    print('[2] Paper')
    print('[3] Scissors')
    action = int(input('Select your action: '))
    print('')
    return action

#Function to define who wins
def whoWins(player_action, computer_action):
    if player_action == computer_action:
        print('Draw')
    elif player_action == 1:
        if computer_action == 2:
            print('You Lose')
        elif computer_action == 3:
            print('You Win')
    elif player_action == 2:
        if computer_action == 1:
            print('You Win')
        elif computer_action == 3:
            print('You Lose')
    elif player_action == 3:
        if computer_action == 1:
            print('You Lose')
        elif computer_action == 2:
            print('You Win')
    print('')
```

Exercise

```
#Function to print who choses what
def printActions(player_action, computer_action):
    if player_action == 1:
        print('You chose rock')
    if player_action == 2:
        print('You chose paper')
    if player_action == 3:
        print('You chose scissors')

    if computer_action == 1:
        print('Computer chose rock')
    if computer_action == 2:
        print('Computer chose paper')
    if computer_action == 3:
        print('Computer chose scissors')
    print('')

# print out some text
print('Rock, Paper, Scissors - HD Remix')

#Play the game
while True:
    player_action = getUserAction()
    computer_action = getComputerAction()

    printActions(player_action, computer_action)

    whoWins(player_action, computer_action)
```


Fin