

Python Code: Finaal EINDWERK (Noa De Causemaeker)

```
from mindstorms import MSHub, Motor, MotorPair, ColorSensor, DistanceSensor, App
from mindstorms.control import wait_for_seconds, wait_until, Timer
from mindstorms.operator import greater_than, greater_than_or_equal_to, less_than,
less_than_or_equal_to, equal_to, not_equal_to
import math
import random
```

OBJECTS: Symbolic name given to motoric or sensoric device

Objects

```
hub = MSHub()
dsensor = DistanceSensor ('C')
rmotor = Motor('F')
lmotor = Motor('E')
motorpair = MotorPair ('F','E')
csensor = ColorSensor('A')
```

VARIABLE: A symbolyc name referencing to a value or object

#VARIABLES

```
count = 0
count_full = 0
inputclothing = 0
inputcode = 0

work_program = 0
work_first_move_empty = 0
work_make_code = 0
work_move_to_empty_slot = 0
work_insert = 0
work_enter = 0

countcode1 = -1
countcode2 = -1
countcode3 = -1
code_insert = []
```

ANIMATIONS: Showed on the light matrix of the hub

#ANIMATIONS

```
clothing = ['09090:99999:09990:09990:09990']
check = ['00009:00090:90900:09000:00000']
wrong = ['90009:09090:00900:09090:90009']
arrow_extract = ['00900:00900:90909:09990:00900']
arrow_insert = ['00900:09990:90909:00900:00900']
anim_clothing_close = [
    '90009:90009:90009:90009:90009',
    '09090:99099:09090:09090:09090',
    '09090:99999:09990:09990:09990'
]
```

```

anim_clothing_open = [
    '09090:99999:09990:09990:09990',
    '09090:99999:09990:09990:09990',
    '09090:99099:09090:09090:09090',
    '90009:90009:90009:90009:90009',
    '00000:00000:00000:00000:00000'
]
anim_arrow_insert = [
    '00000:00000:00000:00000:00000',
    '00000:00000:00000:00000:00900',
    '00000:00000:00000:00900:09990',
    '00000:00000:00900:09990:90909',
    '00000:00900:09990:90909:00900',
    '00900:09990:90909:00900:00900',
    '09990:90909:00900:00900:00000',
    '90909:90909:00900:00900:00000',
    '90909:00900:00900:00000:00000',
    '00900:00900:00000:00000:00000',
    '00900:00000:00000:00000:00000'
]
anim_arrow_extract = [
    '00000:00000:00000:00000:00000',
    '00900:00000:00000:00000:00000',
    '09990:00900:00000:00000:00000',
    '90909:09990:00900:00000:00000',
    '00900:90909:09990:00900:00000',
    '00900:00900:90909:09990:00900',
    '00000:00900:00900:90909:09990',
    '00000:00000:00900:00900:90909',
    '00000:00000:00000:00900:00900',
    '00000:00000:00000:00000:00900'
]
anim_dot = [
    '00000:00000:00000:00000:00000',
    '00000:00000:00000:00000:00900'
]

```

SPEEDS: Default speed set for motors

MOTOR SPEEDS

```

rmotor.set_default_speed(10)
lmotor.set_default_speed(10)

```

DICTIONARY: The database used for the security codes

#CLASS/DICTIONARY

```

codes = {
    'slot1': "000",
    'slot2': "000",
    'slot3': "000",
    'slot4': "000",
}

```

FUNCTION: A block of code which only runs when it is called

#FUNCTIONS

```
def clothing_count():
    global count
    dsensor.wait_for_distance_closer_than (7, 'cm')
    rmotor.stop()
    lmotor.stop()
    count = count + 1
    print ('ADMIN: clothingcount is ',count)
    rmotor.start()
    lmotor.start()
    wait_for_seconds(3)
```

```
def move_to_clothing():
    global count
    count = 0
    rmotor.start()
    lmotor.start()
    csensor.wait_until_color('red') #so that count can start from 0
    csensor.wait_until_color('black') #so that it doesnt see redmarker as clothing
    print("ADMNI: red marker was detected, countclothing is 0")
    while count != inputclothing:
        clothing_count()

    lmotor.stop()
    rmotor.stop()
```

```
def move_to_full():
    print("Moving to full")
    rmotor.start()
    lmotor.start()
    csensor.wait_until_color('red') #so that count can start from 0
    csensor.wait_until_color('black') #so that it doesnt see redmarker as clothing

    while count_full != 5:
        global count_full
        dsensor.wait_for_distance_closer_than (7, 'cm')
        rmotor.stop()
        lmotor.stop()
        count_full = count_full + 1
        wait_for_seconds(1)
        rmotor.start()
        lmotor.start()
        wait_for_seconds(3)

    lmotor.stop()
    rmotor.stop()

    print("THE VESTIAIRE IS NOW FULL")
```

```

def make_code(): (It looks for an empty slot, and changes the '000' value with a random number (the security code))
    global work_make_code
    while work_make_code < 999 :
        if hub.right_button.was_pressed():
            print('ADMIN: Making code for empty slot')
            hub.light_matrix.play_animation(arrow_insert, 1, 'fade out', True)
            if codes['slot1'] == "000":
                print ('ADMIN: slot 1 is empty')
                codes['slot1'] = "{}".format(random.randint(100,999))
                print ('ADMIN: new code for slot 1 is:',codes['slot1'])
                print("USER: Please remember this code...")
                print("ADMIN: Displayong code... (waiting)")
                hub.light_matrix.write(codes['slot1'])
                wait_for_seconds(2)
                hub.light_matrix.write(codes['slot1'])
            else:
                print ('slot 1 is full!')
                if codes['slot2'] == "000":
                    print ('ADMIN: slot 2 is empty')
                    codes['slot2'] = random.randint(100,999)
                    print ('ADMIN: new code for slot 2 is:',codes['slot2'])
                    print("USER: Please remember this code...")
                    print("ADMIN: Displayong code... (waiting)")
                    hub.light_matrix.write(codes['slot2'])
                    wait_for_seconds(2)
                    hub.light_matrix.write(codes['slot2'])
                else:
                    print ('slot 2 is full!')
                    if codes['slot3'] == "000":
                        print ('ADMIN: slot 3 is empty')
                        codes['slot3'] = random.randint(100,999)
                        print ('ADMIN: new code for slot 3 is:',codes['slot3'])
                        print("USER: Please remember this code...")
                        print("ADMIN: Displayong code... (waiting)")
                        hub.light_matrix.write(codes['slot3'])
                        wait_for_seconds(2)
                        hub.light_matrix.write(codes['slot3'])
                    else:
                        print ('slot 3 is full!')
                        if codes['slot4'] == "000":
                            print ('ADMIN:slot 4 is empty')
                            codes['slot4'] = random.randint(100,999)
                            print ('ADMIN: new code for slot 4 is:',codes['slot4'])
                            print("USER: Please remember this code...")
                            print("ADMIN: Displayong code... (waiting)")
                            hub.light_matrix.write(codes['slot4'])
                            wait_for_seconds(2)
                            hub.light_matrix.write(codes['slot4'])
                        else:
                            print ('ADMIN: slot 4 is full!')
                            print ('USER: ALL SLOTS ARE FULL')
                            move_to_full()

```

```
print("ADMIN: This is the new data of codes: ",codes)
work_make_code = 1000
```

```
def move_to_empty_slot(): (It makes the system move to the first empty slot available)
    global work_move_to_empty_slot
    global inputclothing
    global count
    count = 0
    while work_move_to_empty_slot < 999 :
        print("ADMIN: Searching for empty slot")
        hub.light_matrix.start_animation(clothing, 1, True, 'fade out', False)
        #wait_for_seconds(5)
        if codes['slot1'] == "000":
            inputclothing = 1
            print("ADMIN: Moving to empty slot 1")
            move_to_clothing()
            print("ADMIN: Arrived at empty slot 1")
        elif codes['slot2'] == "000":
            inputclothing = 2
            print("ADMIN: Moving to empty slot 2")
            move_to_clothing()
            print("ADMIN: Arrived at empty slot 2")
        elif codes['slot3'] == "000":
            inputclothing = 3
            print("ADMIN: Moving to empty slot 3")
            move_to_clothing()
            print("ADMIN: Arrived at empty slot 3")
        elif codes['slot4'] == "000":
            inputclothing = 4
            print("ADMIN: Moving to empty slot 4")
            move_to_clothing()
            print("ADMIN: Arrived at empty slot 4")
        else: move_to_full()
    work_move_to_empty_slot = 1000
```

```
def enter_check_code(): (Let's the customer enter security code, and checks if it's correct)
    global inputcode
    global work_enter
    global inputclothing
    global work_insert
    global countcode1
    global countcode2
    global countcode3
    global code_insert
    global count
    global pressed
    pressed = 0
    count = 0
    countcode1 = -1
    countcode2 = -1
    countcode3 = -1
```

```

hub.light_matrix.start_animation(anim_dot, 2, True, 'direct', True)
while work_insert == 0:
    if hub.right_button.was_pressed():
        countcode1 = countcode1 +1
        hub.light_matrix.write(countcode1)
    elif hub.left_button.was_pressed():
        hub.light_matrix.off()
        code_digit1 = "{}".format(countcode1)
        code_insert.append(code_digit1)
        print(code_insert)
        work_insert = 1000
print("First digit code:", countcode1)

hub.light_matrix.start_animation(anim_dot, 2, True, 'direct', True)
while work_insert == 1000:
    if hub.right_button.was_pressed():
        countcode2 = countcode2 +1
        hub.light_matrix.write(countcode2)
    elif hub.left_button.was_pressed():
        hub.light_matrix.off()
        code_digit2 = "{}".format(countcode2)
        code_insert.append(code_digit2)
        print(code_insert)
        work_insert = 2000
print("Second digit code:", countcode2)

hub.light_matrix.start_animation(anim_dot, 2, True, 'direct', True)
while work_insert == 2000:
    global inoutcode
    if hub.right_button.was_pressed():
        countcode3 = countcode3 +1
        hub.light_matrix.write(countcode3)
    elif hub.left_button.was_pressed():
        hub.light_matrix.off()
        code_digit3 = "{}".format(countcode3)
        code_insert.append(code_digit3)
        print(code_insert)
        work_insert = 3000
print("Third digit code:", countcode3)

print(code_insert)
print(''.join(code_insert))
inputcode = "{}".format(''.join(code_insert))
while work_enter < 999:
    if inputcode == codes['slot1']:
        inputclothing = 1
        print("ADMIN: Moving to occupied slot 1")
        hub.light_matrix.play_animation(check, 1, 'fade in', False)
        wait_for_seconds(3)
        hub.light_matrix.play_animation(check, 1, 'fade out', True)
        wait_for_seconds(1)
        hub.light_matrix.start_animation(clothing, 1, True, 'fade out', False)

```

```

    move_to_clothing()
    hub.light_matrix.off()
    print("ADMIN: Arrived at occupied slot 1")
    codes['slot1'] = "000"
elif inputcode == codes['slot2']:
    inputclothing = 2
    print("ADMIN: Moving to occupied slot 2")
    hub.light_matrix.play_animation(check, 1, 'fade in', False)
    wait_for_seconds(3)
    hub.light_matrix.play_animation(check, 1, 'fade out', True)
    wait_for_seconds(1)
    hub.light_matrix.start_animation(clothing, 1, True, 'fade out', False)
    move_to_clothing()
    hub.light_matrix.off()
    print("ADMIN: Arrived at occupied slot 2")
    codes['slot2'] = "000"
elif inputcode == codes['slot3']:
    inputclothing = 3
    print("ADMIN: Moving to occupied slot 3")
    hub.light_matrix.play_animation(check, 1, 'fade in', False)
    wait_for_seconds(3)
    hub.light_matrix.play_animation(check, 1, 'fade out', True)
    wait_for_seconds(1)
    hub.light_matrix.start_animation(clothing, 1, True, 'fade out', False)
    move_to_clothing()
    hub.light_matrix.off()
    print("ADMIN: Arrived at occupied slot 3")
    codes['slot3'] = "000"
elif inputcode == ['slot4']:
    inputclothing = 4
    print("ADMIN: Moving to occupied slot 4")
    hub.light_matrix.play_animation(check, 1, 'fade in', False)
    wait_for_seconds(3)
    hub.light_matrix.play_animation(check, 1, 'fade out', True)
    wait_for_seconds(1)
    hub.light_matrix.start_animation(clothing, 1, True, 'fade out', False)
    move_to_clothing()
    hub.light_matrix.off()
    print("ADMIN: Arrived at occupied slot 4")
    codes['slot4'] = "000"
else:
    print("Code entered:", inputcode)
    print("ADMIN: Did not find matching code")
    print("USER: Wrong Password, please try again")
    hub.light_matrix.play_animation(wrong, 1, 'fade in', False)
    wait_for_seconds(3)
    hub.light_matrix.play_animation(wrong, 1, 'fade out', True)

    code_insert = []
    print(code_insert)
work_enter = 1000

```

```

def first_move_empty(): (To start the program, moves to the first empty slot)
    global work_first_move_empty
    global count
    global inputclothing
    count = 0
    while work_first_move_empty < 999:
        wait_for_seconds(2)
        hub.light_matrix.start_animation(clothing, 1, True, 'fade out', False)
        print("ADMIN: Searching for empty slot")
        if codes['slot1'] == "000":
            inputclothing = 1
            print("ADMIN: Moving to empty slot 1")
            move_to_clothing()
            print("ADMIN: Arrived at empty slot 1")
        elif codes['slot2'] == "000":
            inputclothing = 2
            print("ADMIN: Moving to empty slot 2")
            move_to_clothing()
            print("ADMIN: Arrived at empty slot 2")
        elif codes['slot3'] == "000":
            inputclothing = 3
            print("ADMIN: Moving to empty slot 3")
            move_to_clothing()
            print("ADMIN: Arrived at empty slot 3")
        elif codes['slot4'] == "000":
            inputclothing = 4
            print("ADMIN: Moving to empty slot 4")
            move_to_clothing()
            print("ADMIN: Arrived at empty slot 4")
        else: move_to_full()
    work_first_move_empty = 1000

```

#-----

PROGRAM: The actual program where functions are called

```
#PROGRAM
hub.speaker.beep()
print("PROGRAM HAS STARTED")
first_move_empty()
hub.light_matrix.off()
wait_for_seconds(1.5)
hub.light_matrix.play_animation(clothing, 1, 'fade in', False)
print("ADMIN: Vestiaire is now ready to use!")
wait_for_seconds(1)

print("ADMIN: Waiting for customer...")

while work_program < 999:
    if hub.right_button.was_pressed():
        print("ADMIN: Person wants to insert")
        hub.light_matrix.play_animation(anim_clothing_open, 5, 'direct', False)
        hub.light_matrix.start_animation(anim_arrow_insert, 4, True, 'direct', False)
        print("USER: Insert your jacket please... ")
        make_code()
        wait_for_seconds(3)
        print("ADMIN: Displaying check")
        hub.light_matrix.write(('THANKYOU!'))
        wait_for_seconds(2)
        hub.light_matrix.play_animation(anim_clothing_close, 3.5, 'direct', False)
        print("ADMIN: MOVING TO NEXT EMPTY SLOT PROCEDURE HAS STARTED")
        move_to_empty_slot()
        hub.light_matrix.off()
        wait_for_seconds(1)
        hub.light_matrix.play_animation(clothing, 1, 'fade in', False)
        print("ADMIN: ARRIVED AT SLOT")
        print("ADMIN: READY FOR NEXT CUSTOMER")

    elif hub.left_button.was_pressed():
        print("Admin: Person wants to take out")
        hub.light_matrix.play_animation(anim_clothing_open, 5, 'direct', False)
        wait_for_seconds(1)
        hub.light_matrix.start_animation(anim_arrow_extract, 4, True, 'direct', False)
        wait_for_seconds(5)
        hub.light_matrix.off()
        print("USER: Please enter your code...")
        enter_check_code()
        work_insert = 0
        work_enter = 0
        print("ADMIN: All codes are now:", codes)
        hub.light_matrix.off()
        wait_for_seconds(1)
        hub.light_matrix.play_animation(clothing, 1, 'fade in', False)
        print("ADMIN: READY FOR NEXT CUSTOMER")

work_move_to_empty_slot = 0
work_make_code = 0
```