Virtual 2022

CODEfest
College Pathways to Digital Careers

Welcome to Week 4

August 1, 2022

Robotics

Have you ever watched automatic machines working and wondered just how they knew what or where to move, or what to pick up? Robotics has to do with the design, construction, operation and application of robots. Basically, creating and building robots and using computer programming to make them do things that humans would otherwise be doing!

Robotics can be found in many career fields such as Advanced Manufacturing, Automotive, Biotechnology, Computer and Mechanical Engineering, and can be found in settings like factories, sports, food processing and healthcare among others.

A career in robotics can have many different job titles; some include Engineer, Technician, Scientist, and Programmer. Jobs are available in both the public and private sectors, as well as in Research & Development and include an ever-growing number of positions at up-and-coming, forward-thinking companies and organizations. Salaries for this field can vary depending on where you choose to work with experienced workers earning up to $80,000 yearly, but you can expect to enter the occupation with a yearly income of $49,725. *

There are a few courses and programs at Mohawk College that can help lead you to a career in Robotics. Take a look at some of their offerings (they'll let you know which courses you should be looking for in high school too!):

Mechanical Engineering Technology - 529 - 3 Year Advanced Diploma Program
Electrical Engineering Technology - 582 - 3 Year Advanced Diploma Program
Computer Engineering Technology - Mechatronic Systems - 562 - 3 Year Advanced Diploma Program
Bachelor of Technology - Automotive and Vehicle Engineering Technology - 4.5 year Combined Certificate, Diploma & Degree Program
Bachelor of Technology - Automation Engineering Technology—4.5 year Combined Certificate, Diploma & Degree Program

Mohawk is also home to the $3 million FANUC Robotics Training Laboratory, which introduces students to award-winning ROBOGUIDE simulation software from an

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Robotics

Challenge!

This week, we are going to take a look at Virtual EV3 Coding: Sensabot challenge and then move on to Robomind Academy's Hour of Code. You will find a few videos to watch, and a series of instructions to read, follow and practice. To be entered to win one of the prizes this week, you will need to complete the following:

Virtual EV3 Coding: Sensabot

- Create an account on cs2n to get started
- Once you're signed in, select the moving forward task from the list on the left.
- Send us all the **five** screenshots shown on page no. 3.

Robomind Academy's Hour of Code:

- Create an account on RoboMind Academy to get started
- Once you're signed in, select the Hour of Code course from the Courses menu
- Follow the on-screen prompts to complete objectives and missions.
- Start by watching the "Robo moving around" video and complete all the 21 tasks shown below.
- Send us all the screenshots shown on pages no. 4, 5 and 6.

Send your completed exercises to codefest@iechamilton.ca.
Make sure you include your full name!
Prize winners will be contacted next week via the information provided at registration.

You can find our finished missions on the next few pages.

If you are interested in exploring Robotics further, keep completing missions in RoboAcademy or here are a few other fun activities you can follow along with:
Roboblockly, Let's start coding, Thingiverse, Robogarden,
Hour of Code: Emoticon Madness

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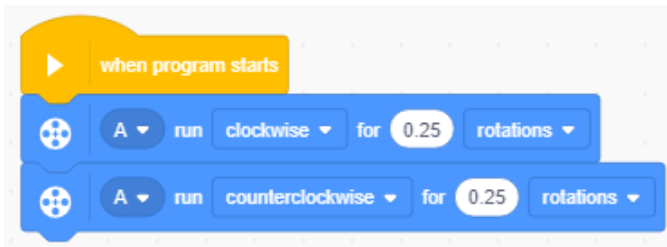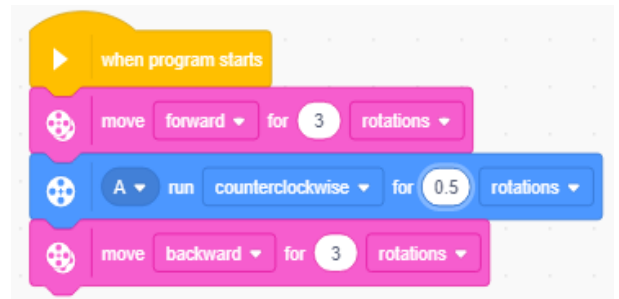## Challenge 1 : Virtual EV3 Coding: Sensabot

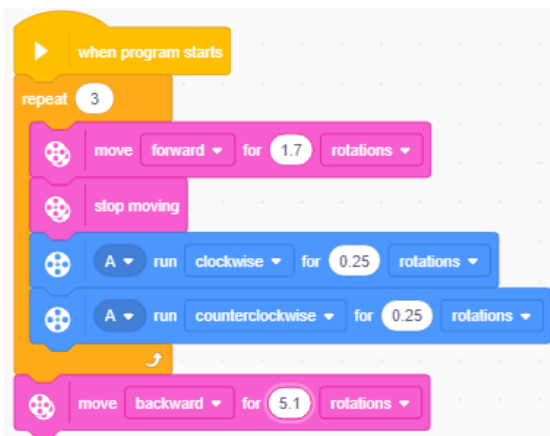### Task 1. Moving Forward
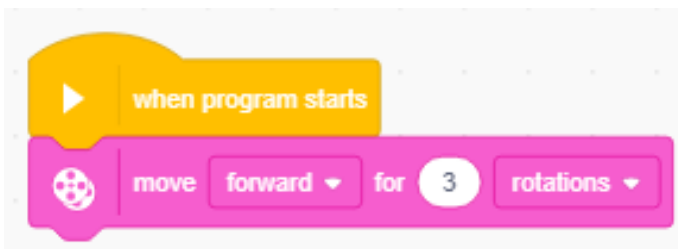
Task 2. Mini Challenge: Move 50 cm
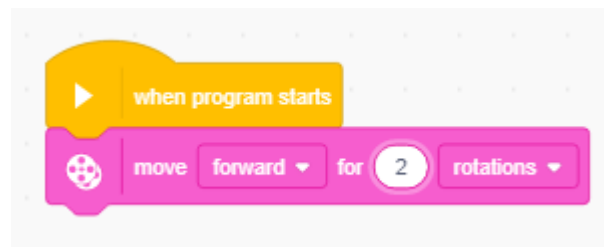
Task 3. Arm Control

Task 4. Mini Challenge: Cargo Retrieval

Task 5. Challenge: Sensabot

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Robotics

Challenge 2: Robomind Academy: Hour of code

1. Pickup the Beacon

```
right
forward
forward
forward
left
forward(2)
pickUp
```

2. Pick up the beacon in upper-right corner

```
# Solution:

right
forward(9)
left
forward(1)
right
forward(2)
left
forward(6)
right
forward(2)
left
forward(2)
pickUp
```

3. Draw a square

```
7    # Solution:
8
9    paintWhite
10   forward(3)
11   right
12   forward(3)
13   right
14   forward(3)
15   right
16   forward(3)
17   right
18   stopPainting
19
```

4. Letter "A"

```
# Solution:

paintBlack
forward(2)
right
forward(1)
right
forward(1)
right(1)
forward(1)
backward(1)
left
forward(1)
stopPainting
left
forward(1)
left
```

5. Letter "M"

```
# Solution:

paintBlack
forward(2)
right
forward(1)
right
forward(2)
backward(2)
left
forward(1)
right
forward(2)
stopPainting
left
forward(1)
left
```

6. Robo Dance

```
1    # Description: Create your own robo
2    # dance. Use any commands you like.
3
4    # Challenge: to get acquainted with
5    # robomind instructions and sequencing.
6
7    # Solution:
8
9    # any solution is ok :-)
10
11   forward(1)
12   backward(1)
13   pickUp
14   left
15   right
16   leftIsClear
17   rightIsClear
```

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Challenge 2: Robomind Academy: Hour of code contd..

7. Draw a smart square

```
# Description: Let the robot draw a
# square, but now use repeat(.){...}
# to make your script more compact.

# Challenge: In the previous program
# forward(3) and right are repeated
# 4 times. You can let the robot do
# the same with a much more compact
# program by using repeat(.){...}

# An example of how to use it is given
# on the Quick Reference Card

# Solution:

paintWhite
repeat(4)
{
    forward(3)
    right
}
stopPainting
```

8. Robo as a security guard

```
# Description: Let the robot go
# to the starting position and
# move around the building.

# Challenge: Use repeat(.){...}

# Solution:

# goto start position
forward(3)
left
forward(4)
right

# go around the building
repeat(4)
{
    forward(5)
    right
}
```

9. Robo as a security guard(2)

```
# Description: Let the robot go
# to the starting position and
# move 3x around the building.
# Challenge: Use repeat(.){...}
# Solution:
# goto start position
forward(3)
left
forward(4)
right

# go around the building 3x
repeat(3)
{
    repeat(4)
    {
        forward(5)
        right
    }
}
```

10. Let's slalom!

```
# Description: Let the robot
# follow the path with the blue
# tiles and pick up the beacon
# at the end.
# Challenge: Use repeat(.){...}.
# Solution:
forward(1)
right
forward(3)
repeat(3)
{
    forward(2)
    right
    forward(2)
    left
    forward(2)
    left
    forward(2)
    right
}
pickUp # To pick up the beacon
```

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Challenge 2: Robomind Academy: Hour of code contd..

11. Let's slalom under the palmtrees!

```
1  # Description: Change you program
2  # to let Robo do a slalom under
3  # the palm trees.
4  # Challenge: Understand what is
5  # repeated and what is unique
6  # in this kind of taks.
7  # Solution:
8  forward(6)
9  right
10 forward(3)
11 repeat(3){
12     forward(2)
13     right
14     forward(2)
15     left
16     forward(2)
17     left
18     forward(2)
19     right
   }
   pickUp
```

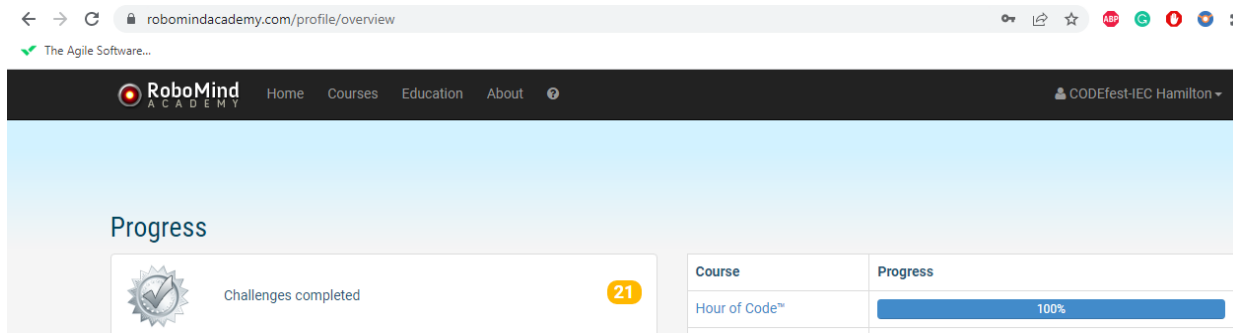### 12. Let's slalom around the crates!

```
1  # Description: Change you program
2  # to let Robo do a slalom around
3  # the crates.
4  # Challenge: Understand what is
5  # repeated and what is unique
6  # in this kind of taks.
7  # Solution:
8  backward(4)
9  right
10 forward(3)
11 repeat(3){
12     forward(2)
13     right
14     forward(2)
15     left
16     forward(2)
17     left
18     forward(2)
19     right
   }
   pickUp
```

Final screenshot that shows all 21 challenges are completed (must be included in the submission):

Make sure you have created your account and are signed in.
To open your profile, click Profile from the drop down menu under your name (shown in top-right corner) or use this link-https://www.robomindacademy.com/profile/overview.