Wait Program!

Wait Program! Pre-Quiz

1. Why is it often better to use conditional commands rather than program a robot to move exact distances?

2. What is the function of a wait block? Explain how to use a wait block in a program.

3. What should the move block that comes right before a wait block have its duration set to?

Wait Program! Pre-Quiz Answers

1. **Why is it often better to use conditional commands rather than program a robot to move exact distances?**

   It can be tedious to measure exact distances and the robot does not always move consistently, depending on factors beyond your control (battery charge, motor speed fluctuations, etc.).

2. **What is the function of a wait block? Explain how to use a wait block in a program.**

   A wait block causes a program to wait until a specified stimulus occurs before proceeding to the next command. A wait block must specify the stimulus being waited on and follow a move block with duration set to unlimited.

3. **What should the move block that comes right before a wait block have its duration set to?** Unlimited

Challenge 1:
Program the robot to move forward until it hears a clap, then turn left

Make sure the sound sensor is attached to port 2 of your robot.

Questions to think about while you program:

- **What do you want the robot to do before it hears a sound?**
- **What should the duration of this action be set to?**
- **Which sensor do you want the wait block to depend on?**
- **What do you want the robot to do after it hears a sound?**

Challenge 1 Programming Solution

Challenge 2:
Wait Block Programming Challenge

Do This: Write a program so that your robot:

- **Remains at rest until you press the touch sensor.**

- **Once you press the touch sensor, moves slowly forward until you press the touch sensor again.**

- **Once the touch sensor is pressed a second time, moves twice as fast.**

- **Once the touch sensor is pressed a third time, moves twice as fast as before.**

- **Once the touch sensor is pressed a fourth time, stops.**

   HINT Robot speed can be controlled by adjusting the power setting on a move block.
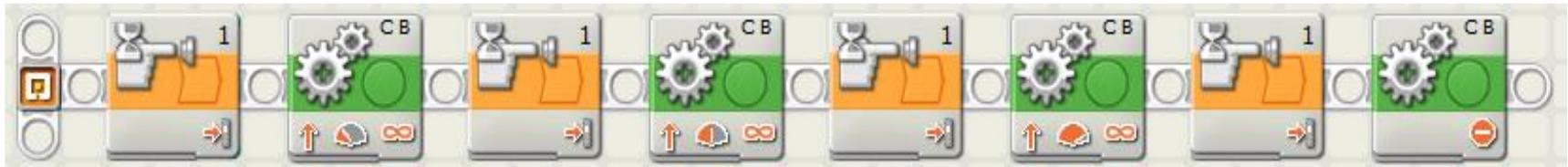
Challenge 2 Programming **Solution**

A   B   C   D   E   F   G   H

A — Wait
- Control: Sensor
- Sensor: Touch Sensor
- Port: ◉1 ○2 ○3 ○4
- Action: ◉ Pressed ○ Released ○ Bumped
- 0

B — Move
- Port: ☐ A ☑ B ☑ C
- Direction: ◉ ↑ ○ ↓ ○ ⊘
- Steering: C | ↑ | B
- Power: 25
- Duration: 360 Unlimited
- Next Action: ◉ Brake ○ Coast
- R: 0 A, 0 B, 0 C

C — Wait
- Control: Sensor
- Sensor: Touch Sensor
- Port: ◉1 ○2 ○3 ○4
- Action: ◉ Pressed ○ Released ○ Bumped
- 0

D — Move
- Port: ☐ A ☑ B ☑ C
- Direction: ◉ ↑ ○ ↓ ○ ⊘
- Steering: C | ↑ | B
- Power: 50
- Duration: 360 Unlimited
- Next Action: ◉ Brake ○ Coast
- R: 0 A, 0 B, 0 C

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Challenge 2 Programming Solution

A   B   C   D   E   F   G   H

(continued)

E

Wait		
Control:	Sensor	Port: ◉1 ○2 ○3 ○4
Sensor:	Touch Sensor	Action: ◉ →| Pressed
		○ ←| Released
0		○ ↔| Bumped

F

Move		
R	Port: ☐ A ☑ B ☑ C	Power: ———————● 100
0 A	Direction: ◉ ↑ ○ ↓ ○ ⊖	Duration: 360 Unlimited
0 B	Steering: C▾ ↑ B▾	Next Action: ◉ ▷| Brake ○ ▷▷ Coast
0 C		

G

Wait		
Control:	Sensor	Port: ◉1 ○2 ○3 ○4
Sensor:	Touch Sensor	Action: ◉ →| Pressed
		○ ←| Released

H

Move		
R	Port: ☐ A ☑ B ☑ C	Power: ———————● 75
0 A	Direction: ○ ↑ ○ ↓ ◉ ⊖	Duration: 1 Rotations
0 B	Steering: C▾ ⊖ B▾	Next Action: ◉ ▷| Brake ○ ▷▷ Coast
0 C		

Wait Program! Post-Quiz

1. Why is it often better to use conditional commands rather than program a robot to move exact distances?

2. What is the function of a wait block? Explain how to use a wait block in a program.

3. What is an algorithm?

Wait Program! Post-Quiz **Answers**

1. **Why is it often better to use conditional commands rather than program a robot to move exact distances?**

   It can be tedious to measure exact distances and the robot does not always move consistently, depending on factors beyond your control (battery charge, motor speed fluctuations, etc.).

2. **What is the function of a wait block? Explain how to use a wait block in a program.**

   A wait block causes a program to wait until a specified stimulus occurs before proceeding to the next command. A wait block must specify the stimulus being waited on and follow a move block with duration set to unlimited.

3. **What is an algorithm? An algorithm is a clear and specific procedure for solving a problem in a finite number of steps.**

Vocabulary

algorithm: A clear and specific procedure for solving a problem in a finite number of steps.

conditional command: A command in which the completion of an action depends on a condition being satisfied. For example, if I see a stop sign (condition), I stop (action).

engineering design process: A series of steps used by engineering teams to guide them as they develop new solutions, products or systems.

iteration: Doing something again.

stimulus: Something that rouses or incites to activity. For the purposes of this lesson, it is an action that can be perceived by a robot that causes it to move on to the next part of the program.

Images Sources

Slide 1: Boy holding stop sign; source: Microsoft® clipart: http://office.microsoft.com/en-us/images/results.aspx?qu=stop&ex=1#ai:MP900422690|mt:2|

Device and programming images from LEGO MINDSTORM NXT User's Guide http://goo.gl/wuhSUA

Screen captures and diagrams by author