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Assignment: 8838E Virtual Skills Online Challenge Submission Code/PDF

Notes: Middle School Team 8838E from Irvine California.

Playground: VRC Virtual Skills - Over Under

Project Name: 8838E Virtual Skills Code

Project Type: Blocks

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Playground Screenshot Not Found

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```
define Drive to Y number
Calculating the distance the robot must go to move to any Y position
if 0 > GPS position Y in inches then
getting the absolute value of the desired Y position minus the absolute value of the coordinate position of the
drive forward for abs of number - abs of GPS position Y in inches inches
if GPS position Y in inches > 0 then
drive forward for number - GPS position Y in inches inches
```

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```
define Xpid
  set TargetX to 7.6
  Get Current X position
  set DistancX to GPS position X in inches
  if 0 > DistancX then
    Get the Needed Distance by adding the ABS of X Position with the T
    set NeededDistance to abs of DistancX + TargetX
    set TimingX to NeededDistance / Incs
  if DistancX > 0 then
    set NeededDistance to DistancX - TargetX
    set TimingX to NeededDistance / Incs
```

The image shows a Scratch script for a function named 'Xpid'. It starts with a 'define' block. Inside, it sets 'TargetX' to 7.6. A comment block says 'Get Current X position'. Then, it sets 'DistancX' to 'GPS position X in inches'. There are two conditional blocks. The first is 'if 0 > DistancX then', which contains a comment 'Get the Needed Distance by adding the ABS of X Position with the T', followed by 'set NeededDistance to abs of DistancX + TargetX' and 'set TimingX to NeededDistance / Incs'. The second is 'if DistancX > 0 then', which contains 'set NeededDistance to DistancX - TargetX' and 'set TimingX to NeededDistance / Incs'.

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```
define Drive to X number
Calculating the distance the robot must go to move to any X position
if 0 > GPS position X in inches then
getting the absolute value of the desired position minus the absolute value of the coordinate position of the r
drive forward for abs of number - abs of GPS position X in inches inches
if GPS position X in inches > 0 then
drive forward for number - GPS position X in inches inches
```

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```

define TrianglePID
  Not Really PID but acts similarly
  set TargetX to 3
  Get Current X and Y positions
  set DistancX to GPS position X in inches
  set TargetY to 8
  set DistancY to GPS position Y in inches
  Multiple IF statements for every scenario
  if 0 > DistancX then
    Get the Needed Distance by adding the ABS of X Position with the Target X
    set NeededDistance to abs of DistancX + TargetX
  if DistancX > 0 then
    set NeededDistance to DistancX - TargetX
  if 0 > DistancY then
    set NeededDistanceY to abs of DistancX + TargetX
  if DistancY > 0 then
    set NeededDistanceY to DistancX - TargetX
  Get the variable A^2 and B^2 then add them to get C^2, then get the Square Root of C^2 (Pythagorean's Theorem)
  set TriangleDistanceNeed to NeededDistance * NeededDistance + NeededDistanceY * NeededDistanceY
  set FindDistanceTri to sqrt of TriangleDistanceNeed
  Get the timing by dividing the shortest distance by the speed in Inches/Sec
  set TimingTri to FindDistanceTri / Incs

```

```

define ItriPID
  Set both Target X and Target Y
  set TargetX to 2
  set DistancX to GPS * position X * in inches
  set TargetY to 7.8
  set DistancY to GPS * position Y * in inches
  if 0 > DistancX then
    Get the Needed Distance by adding the ABS of X Position with the Target X
    set NeededDistance to abs of DistancX + TargetX
  if DistancX > 0 then
    set NeededDistance to DistancX - TargetX
  if 0 > DistancY then
    Get the Needed Y Distance by adding the absolute value of Y Position with the Target Y
    set NeededDistanceY to abs of DistancX + TargetX
  if DistancY > 0 then
    set NeededDistanceY to DistancX - TargetX
  Get the variable A^2 and B^2 then add them to get C^2, then get the Square Root of C^2 (Pythagorean's Theorem)
  set TriangleDistanceNeed to NeededDistance * NeededDistance + NeededDistanceY * NeededDistanceY
  set FindDistanceTri to sqrt of TriangleDistanceNeed
  Get the timing by dividing the shortest distance by the speed in Inches/Sec
  set TimingTri to FindDistanceTri / Incs
  Get the outtake timing by getting the absolute value of TimingTri minus Intake Dispense Time
  set TimingTriangle to abs of TimingTri - Idps

```

define CalculateTurnTime

This function was only used as a calculator in order to calculate how long it would take the robot to turn

This is because I put "and dont wait" for nearly every turn as I realized that it was just barely faster, th

In this I would set "degrees" to the amount of degrees the robot would turn by

set Degrees to 90

Divide 180 by degrees

set Divide to abs of 180 / Degrees

Calculate how long it takes for the robot to turn a certain amount

set TimetoTurn to TurnTime / Divide

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```

define TimePID
  set TargetX to 5.6
  Get Current X position
  set DistancX to GPS position X in inches
  if 0 > DistancX then
    Get the Needed Distance by adding the ABS of X Position with the Target X
    set NeededDistance to abs of DistancX + TargetX
    Get the TimingX by dividing the Needed Distance by the speed in Inches/Sec
    set TimingX to NeededDistance / Incs
  if DistancX > 0 then
    set NeededDistance to DistancX - TargetX
    set TimingX to NeededDistance / Incs
  Get the timing for the intake by subtracting the time it takes to get to the position by time i
  set TimingIntake to abs of TimingX - Idps

```

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Scaled up images of our code.

```
when started
  Setup
  set drive velocity to 400 %
  set turn velocity to 400 %
  set TurnTime to 0.6
  set Idps to 0.8
  set Incs to 39.4
  set ArmMotor velocity to 400 %
  set IntakeMotor velocity to 400 %
  Spinning Arm Down
  spin ArmMotor to position 6 turns and don't wait
  First Triball (Preload)
  drive forward for 56 inches
  wait 0.35 seconds
  Outtake
  spin IntakeMotor outtake for 400 degrees and don't wait
  Second Triball (Field Preload)
  turn to heading -90 degrees
  wait 0.15 seconds
  turn to heading 0 degrees
  Intake
```

The code is structured as follows:

- when started**
 - Setup
 - set drive velocity to 400 %
 - set turn velocity to 400 %
 - set TurnTime to 0.6
 - set Idps to 0.8
 - set Incs to 39.4
 - set ArmMotor velocity to 400 %
 - set IntakeMotor velocity to 400 %
 - Spinning Arm Down
 - spin ArmMotor to position 6 turns and don't wait
 - First Triball (Preload)
 - drive forward for 56 inches
 - wait 0.35 seconds
 - Outtake
 - spin IntakeMotor outtake for 400 degrees and don't wait
 - Second Triball (Field Preload)
 - turn to heading -90 degrees
 - wait 0.15 seconds
 - turn to heading 0 degrees
 - Intake

```
spin IntakeMotor intake for 50 degrees
turn to heading -90 degrees and don't wait
wait 0.3 seconds
Turning and outtake into goal
spin IntakeMotor outtake for 400 degrees and don't wait
Third Triball (Front Middle)
wait 0.5 seconds
turn to heading 85 degrees and don't wait
wait 0.65 seconds
drive forward for 6 inches
Intaking Front Middle triball
spin IntakeMotor intake for 10 degrees
turn to heading 55 degrees and don't wait
wait 0.2 seconds
drive forward for 17 inches
turn to heading 90 degrees and don't wait
wait 0.2 seconds
Readjusting position of robot to the correct position
Drive to X 14.65
spin IntakeMotor outtake for 600 degrees and don't wait
wait 0.12 seconds
Calculates how long to get to x position from current position
```

The image shows a Scratch script for a robot's navigation and ball intake process. The script is composed of several blocks: a 'spin' block for the intake motor (50 degrees), a 'turn to heading' block (-90 degrees), a 'wait' block (0.3 seconds), a comment block 'Turning and outtake into goal', another 'spin' block for the outtake motor (400 degrees), a comment block 'Third Triball (Front Middle)', a 'wait' block (0.5 seconds), a 'turn to heading' block (85 degrees), a 'wait' block (0.65 seconds), a 'drive forward' block (6 inches), a comment block 'Intaking Front Middle triball', a 'spin' block for the intake motor (10 degrees), a 'turn to heading' block (55 degrees), a 'wait' block (0.2 seconds), a 'drive forward' block (17 inches), a 'turn to heading' block (90 degrees), a 'wait' block (0.2 seconds), a comment block 'Readjusting position of robot to the correct position', a 'Drive to X' block (14.65), a 'spin' block for the outtake motor (600 degrees), a 'wait' block (0.12 seconds), and a final comment block 'Calculates how long to get to x position from current position'.

Xpid

drive forward for 50 inches and don't wait

Drives forward for the amount of time it takes to get to x position

wait 0.559534535872737 seconds

Fourth Triball (Middle)

drive reverse for 22 inches

turn to heading 125 degrees and don't wait

Intaking Middle Triball

spin IntakeMotor intake for 75 degrees

turn to heading 90 degrees and don't wait

wait 0.216 seconds

Calculates how long the robot should outtake before driving forward in order to get an ideal launching position

ITimePID

Outaking Middle Triball

spin IntakeMotor outtake for 600 degrees and don't wait

Wait for the time calculated in ITimePID

wait TimingIntake seconds

drive forward for 32 inches and don't wait

Calculates how long it takes the robot to move from one position to another, in seconds.

Xpid

Wait for the time calculated in Xpid

```
wait TimingIntake seconds
drive forward for 32 inches and don't wait
Calculates how long it takes the robot to move from one position to another, in seconds.
Xpid
Wait for the time calculated in Xpid
wait TimingX seconds
Fifth Triball (Left Middle)
drive reverse for 24 inches
turn to heading 45 degrees
drive forward for 37 inches and don't wait
Intaking fifth triball
spin IntakeMotor intake for 50 degrees
turn to heading 90 degrees and don't wait
wait 0.25 seconds
Outaking fifth triball
spin IntakeMotor outtake for 600 degrees and don't wait
Calculating wait times :)
ITimePID
wait TimingIntake seconds
drive forward for 50 inches and don't wait
```

Xpid

wait **TimingX** seconds

Sixth Triball (Far Left Middle)

drive **reverse** for **20** inches ▶

turn to heading **15** degrees ◀ and don't wait

wait **0.3** seconds

drive **forward** for **18** inches ▶

Intaking

spin **IntakeMotor** **intake** for **5** degrees ◀ and don't wait

turn to heading **110** degrees ◀ and don't wait

Waiting the amount of time the robot takes to turn to 110 degrees from the heading 15 degrees.

wait **0.3** seconds

Outaking triball

spin **IntakeMotor** **outtake** for **500** degrees ◀ and don't wait

wait **0.1** seconds

drive **forward** for **27** inches ◀ and don't wait

Preset wait times because area does not fit criteria to use ITimePID and Xpid

wait **0.78** seconds

turn to heading **48** degrees ◀ and don't wait

wait **0.221** seconds

Seventh Triball (Left Top Corner)

drive **forward** for **50** inches ▶

```
spin IntakeMotor intake for 5 degrees and don't wait
wait 0.1 seconds
spin IntakeMotor outtake for 600 degrees and don't wait
turn to heading 170 degrees
wait 0.15 seconds
Eight Triball (Far Left)
drive forward for 40 inches and don't wait
wait 0.5 seconds
turn to heading -30 degrees and don't wait
wait 0.533 seconds
drive forward for 24 inches
turn to heading -88 degrees and don't wait
wait 0.193 seconds
spin IntakeMotor intake for 500 degrees and don't wait
drive forward for 32 inches
drive reverse for 32 inches
turn to heading 160 degrees and don't wait
wait 0.373 seconds
drive forward for 24 inches
spin IntakeMotor outtake for 600 degrees and don't wait
wait 0.5 seconds
Ninth Triball (Left Bottom Corner)
```

The image shows a Scratch script for a robot's path. It consists of several blocks: a 'spin' block for the IntakeMotor to intake for 5 degrees, followed by a 0.1-second wait. Then, another 'spin' block for the IntakeMotor to outtake for 600 degrees, followed by a 'turn to heading 170 degrees' block and a 0.15-second wait. A comment block 'Eight Triball (Far Left)' is present. The path continues with a 'drive forward for 40 inches' block, a 0.5-second wait, a 'turn to heading -30 degrees' block, a 0.533-second wait, a 'drive forward for 24 inches' block, a 'turn to heading -88 degrees' block, a 0.193-second wait, a 'spin IntakeMotor intake for 500 degrees' block, a 'drive forward for 32 inches' block, a 'drive reverse for 32 inches' block, a 'turn to heading 160 degrees' block, a 0.373-second wait, a 'drive forward for 24 inches' block, a 'spin IntakeMotor outtake for 600 degrees' block, and a final 0.5-second wait. A comment block 'Ninth Triball (Left Bottom Corner)' is at the end.


```
drive reverse for 26 inches
```

```
turn to heading -90 degrees
```

Driving under left side hang bar

```
drive forward for 94 inches
```

```
turn to heading -45 degrees
```

Intaking left bottom triball

```
spin IntakeMotor intake for 50 degrees and don't wait
```

```
drive reverse for 60 inches
```

```
turn to heading 100 degrees
```

ItriPID

```
spin IntakeMotor outtake for 600 degrees and don't wait
```

```
wait 0.22 seconds
```

TrianglePID

```
drive forward for 50 inches and don't wait
```

```
wait TimingTri seconds
```

Tenth Triball (Right Middle)

```
drive reverse for 17 inches
```

```
turn to heading 170 degrees
```

Driving towards tenth triball

```
drive forward for 24 inches
```

Intaking tenth triball

```
spin IntakeMotor intake for 50 degrees and don't wait
turn to heading 90 degrees
ITimePID
Outaking tenth triball
spin IntakeMotor outtake for 600 degrees and don't wait
wait 0.53 seconds
Xpid
drive forward for 50 inches and don't wait
wait 0.32 seconds
Eleventh Triball (Far Right Middle)
drive reverse for 24 inches
turn to heading 160 degrees
drive forward for 20 inches
spin IntakeMotor intake for 5 degrees and don't wait
turn to heading 67 degrees
spin IntakeMotor outtake for 600 degrees and don't wait
Preset wait times as area does not fit criteria to use ITimePID and Xpid
wait 0.28 seconds
drive forward for 50 inches and don't wait
wait 0.5 seconds
drive reverse for 45 inches
turn to heading -135 degrees
```

The image shows a Scratch script for a robot. It consists of several blocks: a 'spin' block for IntakeMotor (intake) for 50 degrees, a 'turn to heading' block for 90 degrees, an 'ITimePID' block, a comment 'Outaking tenth triball', another 'spin' block for IntakeMotor (outtake) for 600 degrees, a 'wait' block for 0.53 seconds, an 'Xpid' block, a 'drive' block (forward) for 50 inches, a 'wait' block for 0.32 seconds, a comment 'Eleventh Triball (Far Right Middle)', a 'drive' block (reverse) for 24 inches, a 'turn to heading' block for 160 degrees, a 'drive' block (forward) for 20 inches, a 'spin' block for IntakeMotor (intake) for 5 degrees, a 'turn to heading' block for 67 degrees, a 'spin' block for IntakeMotor (outtake) for 600 degrees, a comment 'Preset wait times as area does not fit criteria to use ITimePID and Xpid', a 'wait' block for 0.28 seconds, a 'drive' block (forward) for 50 inches, a 'wait' block for 0.5 seconds, a 'drive' block (reverse) for 45 inches, and a final 'turn to heading' block for -135 degrees.

```
drive forward for 28 inches ▶
Matchloading First 3 Triballs
repeat 3
  Intaking matchload zone triball
  spin IntakeMotor intake for 5 degrees ◀ and don't wait
  drive reverse for 60 inches ▶
  turn to heading 90 degrees ▶
  Turning towards red goal
  spin IntakeMotor outtake for 600 degrees ◀ and don't wait
  Waiting preset time as area does not fit criteria for ITimePID, but does fit for Xpid
  wait 0.19 seconds
  Xpid
  drive forward for 50 inches ◀ and don't wait
  wait TimingX seconds
  drive reverse for 18 inches ▶
  turn to heading -135 degrees ▶
  drive forward for 60.5 inches ▶
Grabbing 4th matchload triball
spin IntakeMotor intake for 5 degrees ◀ and don't wait
turn to heading 100 degrees ◀ and don't wait
```

```
wait 0.45 seconds
Pushes Right Triball
drive forward for 100 inches
Dispenses 4th matchload triball
spin IntakeMotor outtake for 600 degrees and don't wait
turn to heading 20 degrees and don't wait
Long wait in order for robot to outtake triball
wait 0.65 seconds
turn to heading 120 degrees and don't wait
wait 0.3 seconds
drive forward for 7 inches
Twelfth Triball (Top Right Triball)
spin IntakeMotor intake for 5 degrees
wait 0.1 seconds
spin IntakeMotor outtake for 600 degrees and don't wait
turn to heading 24 degrees and don't wait
Long wait in order for robot to outtake triball
wait 0.7 seconds
drive forward for 30 inches and don't wait
wait 0.355 seconds
drive reverse for 18 inches
```