Rover Plays Fetch

Problem to Solve

A table tennis ball will be placed a distance away from Rover. Your task is to teach Rover to retrieve the ball. You are not limited to the number of attempts successful or unsuccessful.

Teacher:

> The main purpose of this activity is to introduce basic drive commands and to encourage students to try again if they fail.

Check List

Prior to starting you need to check that Rover is set up and ready for play.

- Calculator is placed on top of Rover and 'buckled' in.

- Calculator to Innovator cable is connected.
  [USB A connection goes to the calculator]

- Calculator is switched on
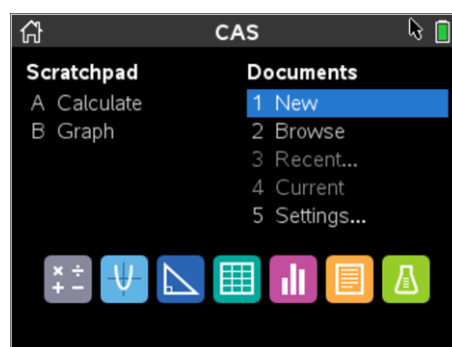
- Rover is switched on
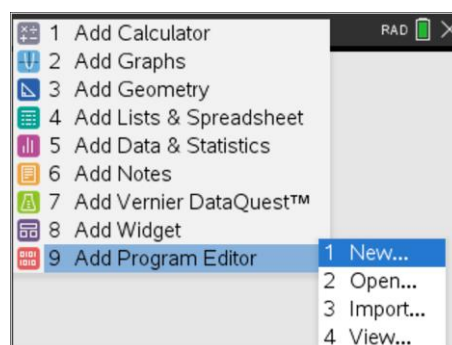
Programming

Press the HOME key: 🏠on

Start a new document.

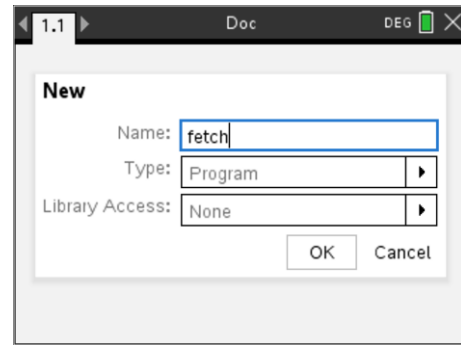If you are prompted to save your existing document, select NO.

There are many applications to choose from on the TI-Nspire calculator. We will be starting with the Programming application.

Select option 9: **Add Program Editor > New**

Authors: Peter Fox
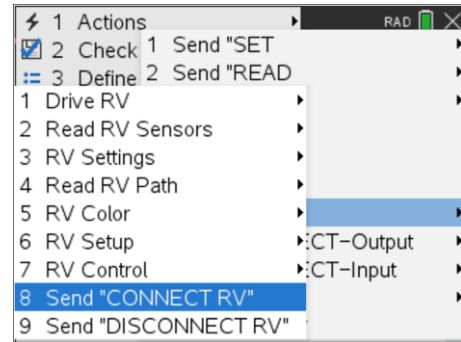
When prompted, type the name of the program.

Program Name: Fetch

The first task for the program is to alert Rover that the calculator is attached so that the communication lines are open. This is a built in programming instruction.

Press: [menu] > **Hub > Rover > Send "CONNECT RV"**

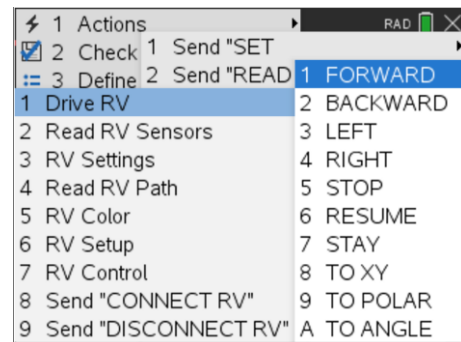Press: [enter]   [This accepts the command and inserts a new line]

The next step is to send a driving command to Rover.

Press: [menu] > **Hub > Rover > Drive RV > Forward**

Before pressing the Enter key, insert a number between 1 and 3.

Your command will look like:

>   Send "RV FORWARD 2"

The program is now ready to be saved and Rover is ready to drive.

Press [ctrl] then [R]

Place Rover on the driving mat with a clear space in front for Rover to drive, then press [enter].

You can make Rover drive forward again by simply pressing [enter]

Experimentation

It's now time to experiment. You need to be able to predict how far Rover travels when you enter different numbers in the forward command so that you will be able to send Rover off to fetch the ball.

Teacher

> There are many more commands available for the TI-Innovator and TI-Rover. Students could do the 10 minutes of coding exercises, available for free from the Texas Instruments website.
>
> https://education.ti.com/en-au/activities/ti-codes/nspire/10-minutes-innovator
>
> Observation and completion is the main form of assessment for this activity. It leads nicely into Rover Geometry.

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When you ran the program, you may have noticed that a 'new' page appeared: 1.2. This is a 'calculator' application. To return to the programming application press:

ctrl then [◁] [Left arrow on navigation pad]

Navigate to the forward command and change the number in the forward command. Test a range of numbers including decimals.

Your aim is to determine how far Rover moves in relation to the value entered in the Forward command. Once you have changed the number, you can save and run the program again by pressing:

Press ctrl then R followed by enter

Remember to ensure that Rover has lots of space to drive.

It's now time to experiment with turning. Return to the program and move the cursor to the end of the forward command.

Press: enter to create a new line.

The next command will instruct Rover to turn right or left.

Press: menu > Hub > Rover > Drive RV > RIGHT

An angle needs to be entered after the "RIGHT" command.

Try: 90

Your program should now look like the one shown opposite.

Place Rover on the mat once again and run your program.

Press ctrl then R followed by enter

Experiment with different values for the right turn. Try numbers between 0 and 360.

Additional lines of code can be added using the process outlined here. Multiple lines may be added in a single edit. You can also use Copy and Paste commands to reproduce multiple lines of code.
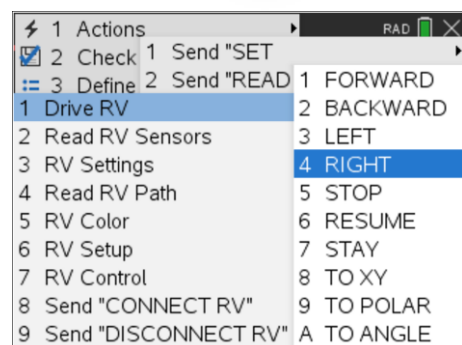
Challenge

A table-tennis ball will be placed some distance away from Rover. Your task is to write a program that will send Rover off to collect and return the table-tennis ball. Rover doesn't have any way of picking up the ball so think about ways in which Rover may return the ball.

> The brain behind Rover is the TI-Innovator. The TI-Innovator can only hold a relatively small number of commands in its buffer. To prevent loss of commands insert an occasional 'wait' command and specify an amount of time (seconds).
>
> The calculator will stop sending commands during this time allowing Rover to catch up.

TEXAS INSTRUMENTS