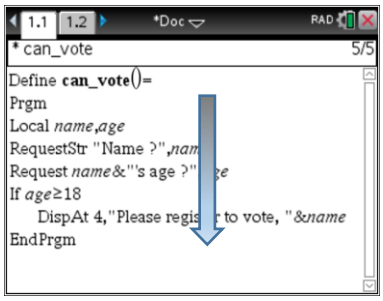
Unit 3: Conditional Statements | **Skill Builder 2: If…Then statements**

In this second lesson for Unit 3, you will learn about **If…Then…EndIf** statements.

Objectives:

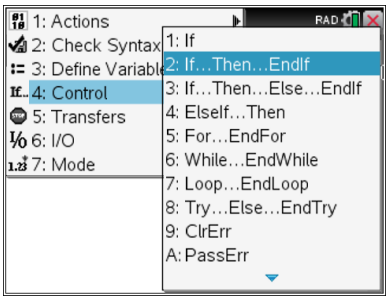
- Examine the **If…Then…EndIf** structure
- Make compound conditions with the relational and the logical operators
- Write a program using the **If…Then…EndIf** structure that examines the regions of the coordinate plane
- Use **DispAt** to control the location of output

Up to now you have been writing programs that have been processing statements from top to bottom. This type of program is called a 'sequence' structure because the statements are processed in the order in which they are written. We now introduce programming statements that allow the program to follow one of two or more alternative paths through the code. This is sometimes known as 'branching' and is implemented with several types of **If…Then** statements.



1. Start a new program, and enter a name for the program.

2. Select **menu > Control.** As you can see from the image at the right, there are four different types of **If** statement templates provided in the TI-Nspire™ CX (items 1 through 4 in the menu). They are used to conditionally process statements.

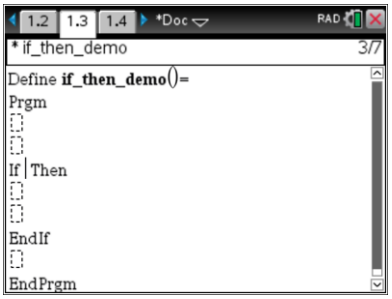


If…Then…EndIf

It is advisable to select these structures from the menu because all the needed components will be inserted into the code in the correct places. You will then go back and 'fill in the blanks.' The image to the right shows the immediate result of selecting **If…Then…Endif** from the **Control** menu:

If Then

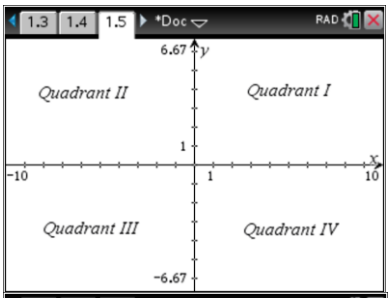
EndIf



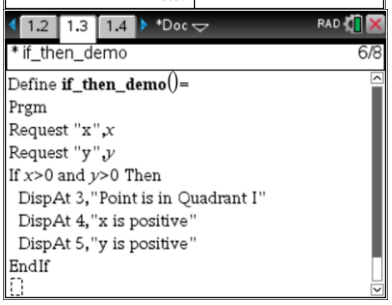
3. After selecting **If…Then…EndIf**, your next task will be to fill in the *condition* (between **If** and **Then**) and the *action* (between **Then** and **Endif**).

A 'Which Quadrant?' Program

We're going to write a more detailed program that lets the user enter values for the variables **x** and **y,** then determines in which quadrant the point **(x,y)** lies, and finally determines the signs of the coordinates in that quadrant.



The first part of the program is shown to the right.



4. Above the **If** statement you will need to add two **Request** statements (one for **x** and one for **y**).

5. Enter the condition (after **If…**) and action (between **Then** and **EndIf**) for Quadrant I as shown to the right.

Remember to separate the keyword 'and' from the surrounding text with spaces before and after the word. Select 'and' from the catalog or just type the keyword.

6. Modify the condition (after **If…**) and action (between **Then** and **EndIf**) for each of the other three quadrants. Y

You can copy and paste the entire **If…EndIf** structure, and then edit the block of code for each Quadrant.
Select text by holding down the **shift** key while arrowing over the text. Then press **ctrl+C** to copy, move the cursor, and press **ctrl+V** to paste the code just like on a computer.

7. After entering the conditions and actions for each Quadrant, test your program with many different values for **x** and **y**.

Are there any values that do not give the desired results? How would you address any issues?

Tech Tip: On the TI-Nspire™ App for iPad®, 'tap and hold' to select text and drag ends to highlight all desired text. Select *Copy*, and then 'tap and hold' and select *Paste*.

Remember to save your file so that your program is saved. The code for the entire program is shown below:

```
Define if_then_demo()=
Prgm
Request "x=",x
Request "y=",y
If x>0 and y>0 Then
  DispAt 3, "Quadrant I"
  DispAt 4, "x is positive"
  DispAt 5,"y is positive"
EndIf
If x<0 and y>0 Then
  Disp At 3,  "Quadrant II"
  Disp At 4,  "x is negative"
  Disp At 5,  "y is positive"
EndIf
If x<0 and y<0 Then
  Disp At 3,  "Quadrant III"
  Disp At 4,  "x is negative"
  Disp At 5,  "y is negative"
EndIf
If x>0 and y<0 Then
  Disp At 3,  "Quadrant IV"
  Disp At 4,  "x is positive"
  Disp At 5,  "y is negative"
EndIf
EndPrgm
```

Teacher Tip: The *if_then_demo( )* program does not display any results when either *x* or *y* is zero. Suggest adding more **If** statements to indicate that the point *(x,y)* is on the x-axis or the y-axis.

The program in this lesson displays the same way whether **Disp** or **DispAt** is used. The advantage of using **DispAt** here will be seen in future lessons where loops can cause a large amount of scrolled information to be displayed.