

Advanced Controls: Radio Button (Python Scripting)

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CONTROL OVERVIEW

[About Radio Button](#)

The **Radio Button** advanced control enables you to select between a collection of choices. The default output is a number that indicates the position of the selected item. A more sophisticated behavior is programmed through a script using the Radio Button class and other features of your scripting language.

To change the appearance of the **Radio Button**, right-click it and then select **Edit > Properties**.

Any settings you have programmed into the script override the settings made in the Properties tab.

In the default script for Radio Button, notice that there are four events: **Start**, **Exec**, **Stop**, and **SelectionChange**. The Exec event is where inputs and outputs can be processed, returning the state of the Radio Button. Procedures for formatting the radio button itself are defined in the Start event, or using the **Properties** tab.

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USE CASE & CODE EXAMPLE

Problem Statement :- A particular problem in Statics is the solution of a threaded screw. The basic solution process is to calculate Tangential Force, Torque, thread angle and whether thread is self locking or not based on varying load, coefficient of friction and selecting Bolt Size:

W = Tensile / Compressive force on the screw

T = Torque

μ = Co-efficient of Friction

θ = Thread Angle

P = Tangential Force

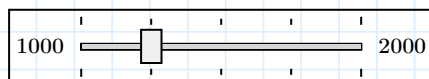
ϕ = Friction Angle

STEP 1 Select one of the following Conditions. Based on selection different (to find) variables will be populated in other radio button.

The Radio Button code initializes options, updates settings based on the selected option, and sets output values accordingly

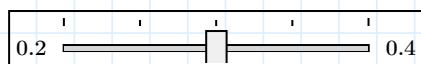
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <input checked="" type="radio"/> Condition 1 <input type="radio"/> Condition 2 </div>	<table border="0" style="width: 100%;"> <tr> <th colspan="3" style="text-align: left; padding-bottom: 5px;">Features Utilized</th> </tr> <tr> <td style="width: 33%; vertical-align: top;"> Methods AddButton SelectedButton </td> <td style="width: 33%; vertical-align: top;"> Formatting Properties LeftText Orientation </td> <td style="width: 33%; vertical-align: top;"> State Properties ButtonID </td> </tr> </table>	Features Utilized			Methods AddButton SelectedButton	Formatting Properties LeftText Orientation	State Properties ButtonID
Features Utilized							
Methods AddButton SelectedButton	Formatting Properties LeftText Orientation	State Properties ButtonID					

Known => Vary the load, co-efficient of friction and select Thread pattern
 Find => Tangential Force (P) or Torque (T)



$W = 1250$

Tensile / Compressive force on the screw



$\mu = 0.3$

Co-efficient of Friction

STEP 2 Select one of the following variable that needs to be calculated.

The radio button dynamically updates its options and appearance based on input values: it sets button labels and orientation based on specific conditions, and outputs the ID of the selected button.

<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <input checked="" type="radio"/> Tangential Force (P) <input type="radio"/> Torque (T) </div>	<table border="0" style="width: 100%;"> <tr> <th colspan="3" style="text-align: left; padding-bottom: 5px;">Features Utilized</th> </tr> <tr> <td style="width: 33%; vertical-align: top;"> Methods AddButton SelectedButton ResetContent </td> <td style="width: 33%; vertical-align: top;"> Formatting Properties LeftText Orientation </td> <td style="width: 33%; vertical-align: top;"> Events SelectionChange </td> </tr> </table>	Features Utilized			Methods AddButton SelectedButton ResetContent	Formatting Properties LeftText Orientation	Events SelectionChange
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$find = 1$

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STEP 3 Select the type of thread of the bolt. Changing the thread type will update the value of 'lead'.

The radio button allows users to select a thread type ("Super Fine," "Fine," or "Course"), and based on the selection, it sets and outputs a corresponding lead value (1.25, 1.50, or 2).

- ☐ Super Fine
☒ Fine
☐ Course

$$l = 1.5$$

Methods

AddButton
ResetContent

State Properties

ButtonID

STEP 4 Select if the bolt is single, double or triple thread upon selection of Radio Button value of lead will update.

This Radio Button allows users to select between "Single," "Double," or "Triple" options. Based on the selection, it multiplies a given value by the corresponding factor and outputs the result.

- ☐ Single
☒ Double
☐ Triple

$$lead = 3$$

Methods

AddButton
SelectedButton
ResetContent

The value of lead is influenced by both the type of thread and the type of thread starting chosen. Specifically, the lead value is calculated by multiplying the thread type by the thread starting type. This means that different thread configurations will result in varying lead values. Understanding the relationship between these factors is crucial for accurate thread performance and functionality.

STEP 5 Select purpose based upon tightening or loosening the bolt.

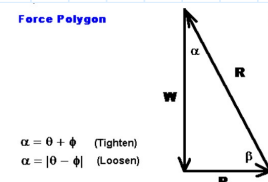
This Radio Button control allows users to select between "Tightened" and "Loosened" options. The selected button's ID is output based on the user's choice.

- ☐ Tightened
☒ Loosened

Methods

AddButton
SelectedButton
ResetContent

Force Polygon



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STEP 6 Add new Radio Button from below text box to step 6.1 if you want to choose different diameter apart from listed

M29

STEP 6.1 Select the bolt size

The below radio button interface initializes with predefined options ("M10", "M12", "M16") and allows adding a new button based on user input. It then extracts and outputs the numeric part of the selected button's text box. It will also check if the input is already present in radio button

- ☐ M10
☐ M12
☒ M16
☐ M29

Methods

AddButton
 GetText
 ResetContent

You have chosen the bolt size of diameter $d = 16$

```

cal(ans) :=
  θ ← atan( $\frac{lead}{\pi \cdot d}$ )
  φ ← atan(μ)
  if cond = 1
    if purpose = 1
      P ←  $\frac{W \cdot \tan(\theta + \phi)}{1 - \mu \cdot \tan(\theta + \phi)}$ 
    else
      P ←  $\frac{W \cdot \tan(\theta - \phi)}{1 + \mu \cdot \tan(\theta - \phi)}$ 
    if find = 1
      return P
    else
      T ←  $P \cdot \frac{d}{2}$ 
      return T
  else
    if find = 1
      return θ
    else
      if φ < 0
        lock ← "Not Self Locking"
      else
        lock ← "Self Locking"
      return lock
  
```

$$cal(W) = -317.607$$

Positive answer indicates that you have chosen to tightened the bolt

Negative answer indicates that you have chosen to loosen the bolt

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USAGE NOTES

Additional Usage Notes for Radio Button

1. To avoid ambiguity, when inserting a new radio button advanced control in PTC Mathcad Prime 11.0.0.0, a radio button is preselected. Refer [here](#) for more information
2. Grouping Radio Buttons
 - Radio Buttons are typically used in groups where only one option can be selected at a time.
3. Event Handling
 - Use the "**SelectionChange**" event to handle changes in the selected Radio Button.
 - The "**Click**" event can be used for additional interactions, but note that it will also trigger on selection changes.
4. Dynamic Updates
 - The "**AddButton**" method can dynamically add new options to the Radio Button group.
 - Use the "**ResetContent**" method to clear selections or reset the Radio Button group when necessary.
5. Consistency
 - Maintain consistent styling and spacing (formatting properties) for all Radio Buttons within a group to provide a clear and user-friendly interface.
6. Performance
 - For large forms or dynamic content, ensure the Radio Button's interactions are efficient to avoid performance lags.

Understanding and utilizing these properties, methods, and events can significantly enhance the functionality and interactivity of radio buttons in Mathcad Prime. The formatting properties allow users to control the appearance and grouping of Radio Buttons, while the state properties provide information about the current state of each button. Methods enable dynamic manipulation of the buttons, and events allow you to respond to user interactions effectively.

By leveraging these features, users can create a more interactive and user-friendly experience in your Mathcad Prime worksheet

For more details refer to [Advanced Control Radio Button Class](#).