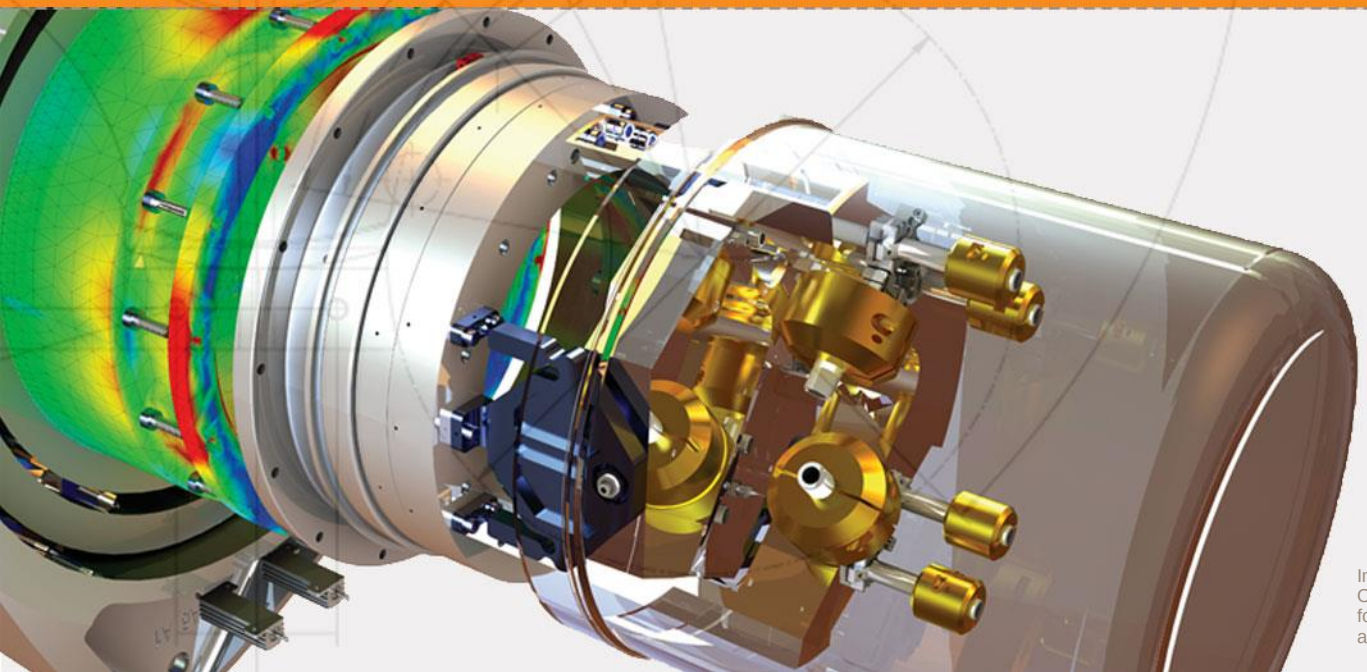
Conditional Statements: Switch Statements



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Why another conditional statement?

- Multiple **elseif** statements can be included within an **if** statement

```
answer = menu('What day is today?', 'a) Mon', 'b) Tues', 'c) Wed',
                                    'd) Thur', 'e) Fri');
if answer == 1
    disp('Today is not Monday!');
elseif answer == 2
    disp('Today is not Tuesday!');
elseif answer == 3
    disp('That is correct!');
elseif answer == 4
    disp('Today is not Thursday!');
elseif answer == 5
    disp('Today is not Friday!');
else
    disp('Are you sure you entered a day?');
end
```

Switch Statements

```
switch   switch_variable
    case  case_expr1
        MATLAB® commands
    case  case_expr2
        MATLAB® commands
        ⋮

    otherwise
        MATLAB® commands
end
```

`switch_variable` is what controls which case is executed

Each case compares the `case_expr` against the `switch_variable` to see if that case should be used

If the case is selected, the MATLAB commands for that case will be executed

If the `switch_variable` does not match any of the cases, the `otherwise` case will be executed

Switch Statements

```
answer = menu('What day is today?', 'a) Mon', 'b) Tues', 'c) Wed',
                                    'd) Thur', 'e) Fri');
switch answer
    case 1
        disp('Today is not Monday!');
    case 2
        disp('Today is not Tuesday!');
    case 3
        disp('That is correct!');
    case 4
        disp('Today is not Thursday!');
    case 5
        disp('Today is not Friday!');
    otherwise
        disp('Are you sure you entered a day?');
end
```

Comments on Switch Statements

- The case expressions can be almost any type of value available in MATLAB:
  - Number

    Ex. `case 1` `case 3.14159`
  - Character

    Ex. `case 'a'` `case '?'`
  - String

    Ex. `case 'pizza'` `case 'spam'`
  - Boolean

    Ex. `case true` `case false`
- You cannot have a vector as a case expressions

Comments on Switch Statements

- It is not necessary to include an **otherwise** statement in a **switch** statement but it is generally a good idea

  Why?

  - Consider the following situation:
    You have written a MATLAB script to present the user with four images produced using a different amount of data. The purpose is to find out which picture is acceptable to the user in an attempt to use the least amount of data (and thus the least amount of memory).

Comments on Switch Statements

- There may be situations where you want to same set of code to execute for several different cases

```
answer = menu('What day is today?', 'a) Mon', 'b) Tues', 'c) Wed',
                                    'd) Thur', 'e) Fri');
switch answer
    case 1
        disp('Today is not Monday!');
    case 2
        disp('Today is not Tuesday!');
    case 3
        disp('That is correct!');
    case 4
        disp('Today is not Thursday!');
    case 5
        disp('Today is not Friday!');
    otherwise
        disp('Are you sure you entered a day?');
end
```

Comments on Switch Statements

- Copy the code into each case:
- Combine multiple cases into a single case:

```
answer = menu('What day is today?', 'a) Mon', 'b) Tues', 'c) Wed',
                                    'd) Thur', 'e) Fri');
switch answer
    case 1
        disp('That is not correct!');
    case 2
        disp('That is not correct!');
    case 3
        disp('That is correct!');
    case 4
        disp('That is not correct!');
    case 5
        disp('That is not correct!');
    otherwise
        disp('Are you sure you entered a day?');
end
```

Comments on Switch Statements

- Multiple cases can be combined by placing them inside curly brackets `{case_expr1, case_expr2,…}`

```
answer = menu('What day is today?', 'a) Mon', 'b) Tues', 'c) Wed',
                                    'd) Thur', 'e) Fri');
switch answer
    case {1, 2, 4, 5}
        disp('That is not correct!');
    case 3
        disp('That is correct!');
    otherwise
        disp('Are you sure you entered a day?');
end
```

switch vs. if

- With multiple conditional statements available, we need to be able to decide when to use them

Use an if when…

- You have a range of values

  `x < 5`

- You have complex conditions

  `x < 5 && x > 2`

- Your condition uses multiple variables

  `x > 10 && y < 5`

- **You can always use an if statement**

Use a switch when…

- You have a specific set of values you need to test
- All of your conditions can be satisfied with == comparisons
- You only have one variable you need to check
- **You should only use a switch with a finite set of possible values**