Topics: Max & min, branching
Reading: CFile 1 Sec 1.3

Max & Min

Consider the quadratic function $q(x) = x^2 + bx + c$ on the interval $[L, R]$:

Q_1: Which is smaller, $q(L)$ or $q(R)$?

Q_2: What is the minimum value of $q(x)$ in $[L, R]$?

```
% Fragment 1
  qL= L^2 + b*L + c;  % q(L)
  qR= R^2 + b*R + c;  % q(R)

  --------------------
     fprintf('qL less than qR\n');

  --------
     fprintf('qR less than or equal to qL\n');

  --------
```

Relational Operators

Operator	Meaning
$>$	greater than
$>=$	greater than or equal to
$==$	equal to
$\sim=$	not equal to
$<=$	less than or equal to
$<$	less than

```
% Fragment 2
  qL= L^2 + b*L + c;  % q(L)
  qR= R^2 + b*R + c;  % q(R)

  if (__________________)
      disp('qL equals qR');

  ----------------------
      disp('qL less than qR');
  else
     fprintf('qR less than or equal to qL');
  end
```

Consider the quadratic function $q(x) = x^2 + bx + c$ on the interval $[L, R]$. What if you only want to know if $q(L)$ is close to $q(R)$?

```
% Fragment 3
  tol= 1e-9;          % tolerance
  qL= L^2 + b*L + c;  % q(L)
  qR= R^2 + b*R + c;  % q(R)
  if ( abs(qL-qR) < tol )
      disp('qL is close to qR');
  end
```

Simple `if` construct

if *Condition*
  Statements to execute if the condition is true
else
  Statements to execute if the condition is false
end

The even simpler `if` construct

if *Condition*
  Statements to execute if the condition is true
end

The `if` construct

if *Condition 1*
  Statements to execute if the condition 1 is true
elseif *Condition 2*
  Statements to execute if the condition 2 is true
⋮
else
  Statements to execute if all previous conditions are false
end

Rules of the `if` construct

- _____ branch of statements is executed
- _____ **else** clause
- _____ **elseif** clauses

Consider the quadratic function $q(x) = x^2 + bx + c$ on the interval $[L, R]$.
What are the critical points?
What do we do with the critical points in order to find the minimum value of $q(x)$ in $[L, R]$?