Max & Min

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

\[ Q_1: \text{Which is smaller, } q(L) \text{ or } q(R)? \]

\[ Q_2: \text{What is the minimum value of } q(x) \text{ in } [L, R]? \]

% Fragment 1
ql = L^2 + b*L + c; \ % q(L)
qr = R^2 + b*R + c; \ % q(R)

fprintf('ql less than qr
');
-----------
fprintf('qr less than or equal to ql
');
-----------

Relational Operators

<table>
<thead>
<tr>
<th>Operator</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;</td>
<td>greater than</td>
</tr>
<tr>
<td>&gt;=</td>
<td>greater than or equal to</td>
</tr>
<tr>
<td>==</td>
<td>equal to</td>
</tr>
<tr>
<td>~</td>
<td>not equal to</td>
</tr>
<tr>
<td>&lt;=</td>
<td>less than or equal to</td>
</tr>
<tr>
<td>&lt;</td>
<td>less than</td>
</tr>
</tbody>
</table>

% 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 \([L, R]\)?