

Recall: If-Then-Else

In general, we test a *condition*, and depending on the result, we execute some *statements*

```
If (condition) then
    statements for condition TRUE
else
    statements for condition FALSE
end if
```

Recall: Conditions

Remember that all conditions must resolve to either TRUE or FALSE values:

- if (`age < 16`) then...
- if (`sum >= 12`) then...
- if (`ratio > 4/3`) then...
- if (`street = "Main"`)...
- if (`city not= "Ottawa"`)...

Testing Multiple Conditions

Not all situations can be handled by a single condition such as $(a > b)$. As our selection process becomes more complex, we can expand our use of the basic if-then-else construct.

1. nested “if” statements
2. “else if” statements
3. logical operators

Nested IF - Pseudocode

```
input "What is your country of citizenship?",  
country
```

```
if (country = "Canada") then  
    input "What is your age", age  
    if (age >=18) then  
        output "Here is your voting ballot."  
    end if  
end if
```

```
put "Please exit the polling station."
```

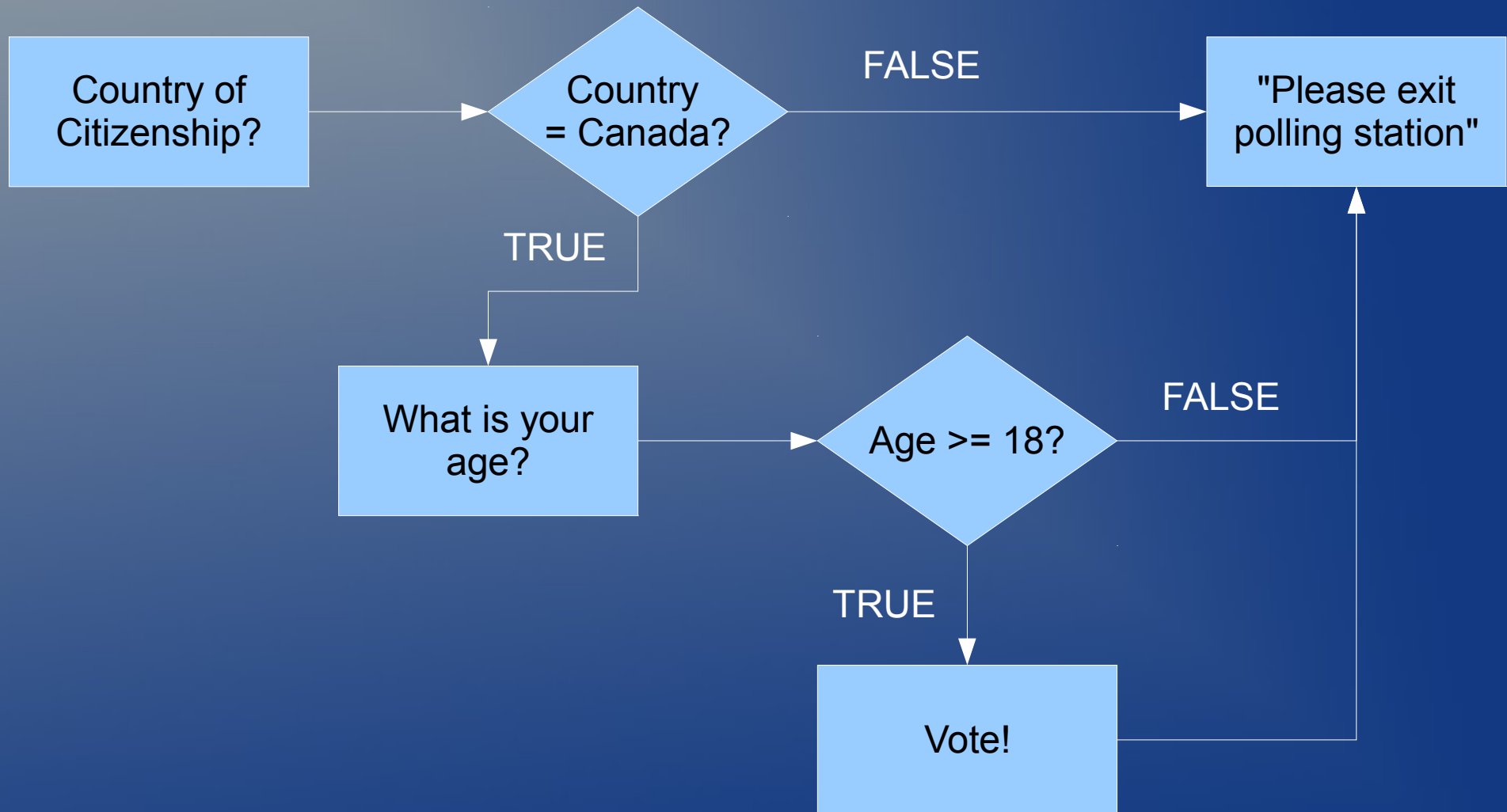
Nested IF - Turing

```
var country : string
var age: int
put "What is your country of citizenship?"..
get country
```

```
if (country = "Canada") then
    % only ask age if Canadian citizen
    put "What is your age"
    get age
    if (age >=18) then
        % voting message only if 18+ years
        put "Here is your voting ballot."
    end if
end if
```

```
% user is done voting, or cannot vote
put "Please exit the polling station."
```

Nested If (multiple conditions)



Example: Nested IF Statements

- write a program which asks the user for their home province
- allow for three different answers (e.g., Ontario, British Columbia, Nova Scotia)
- provide the capital city for the province if known (i.e., one of the three)
- if the capital is unknown, give a different message

variable province is a string

input "Enter a province", province

if (province is Ontario) then

 output "Capital = Toronto"

else

 if (province is Nova Scotia) then

 output "Capital = Halifax"

 else

 if (province is British Columbia) then

 output "Capital = Victoria"

 else

 output "I don't know the capital"

 end if

 end if

end if


```
var province : string
put "Enter a province"
get province : *      % some have spaces

if (province = "Ontario") then
  put "Capital is Toronto"
else
  if (province = "Nova Scotia") then
    put "Capital is Halifax"
  else
    if (province = "British Columbia") then
      put "Capital is Victoria"
    else
      put "I don't know the capital"
    end if
  end if
end if
end if
```

Else If

Sometimes we want to test several “true” conditions, and then have a single response to a “false” condition.

For example, you might state the provincial capital for Ontario, Nova Scotia, and British Columbia, but none of the others.

You could program this using nested “if-then-else” statements, or with “else if” statements.

variable province is a string

input "Enter a province", province

if (province is Ontario) then

 output "Capital = Toronto"

else if (province is Nova Scotia) then

 output "Capital = Halifax"

else if (province is British Columbia) then

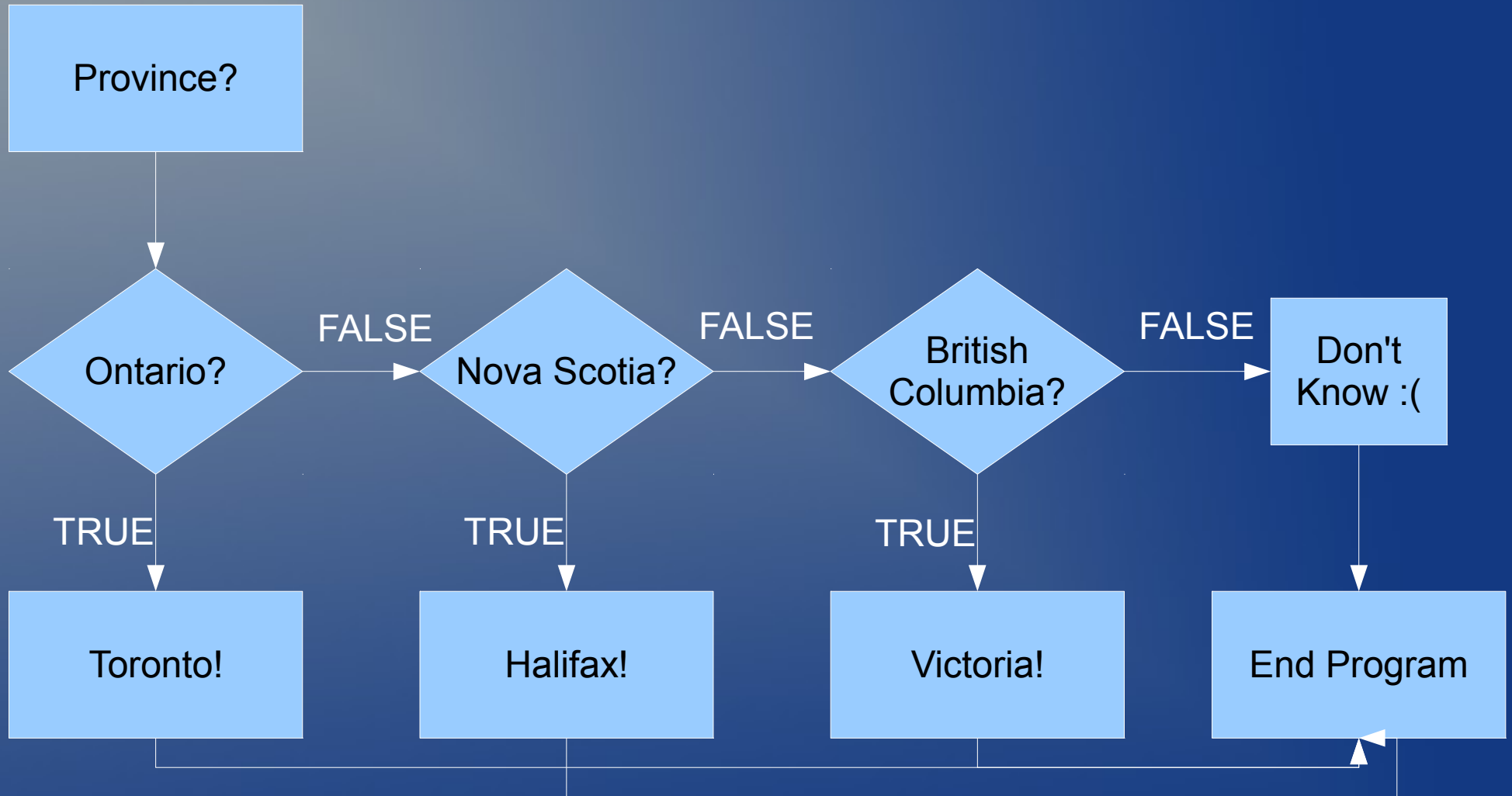
 output "Capital = Victoria"

else

 output "I don't know the capital"

end if

Else If (multiple conditions)



```
var province : string
put "Enter a province"
get province : *

if (province = "Ontario") then
    put "Capital is Toronto"
elseif (province = "Nova Scotia") then
    put "Capital is Halifax"
elseif (province = "British Columbia") then
    put "Capital is Victoria"
else
    % the else covers anything we don't have
    % an answer for
    put "I don't know the capital"
end if
```