

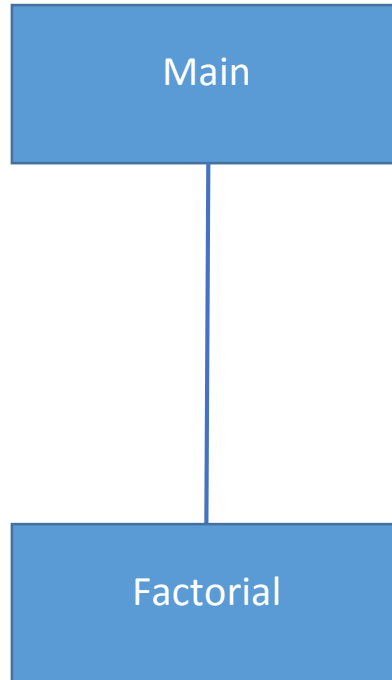
# **PROBLEM STATEMENT**

This program will calculate the end time and cost of a call given the start time, duration, and the different pay rates at certain times of the day.

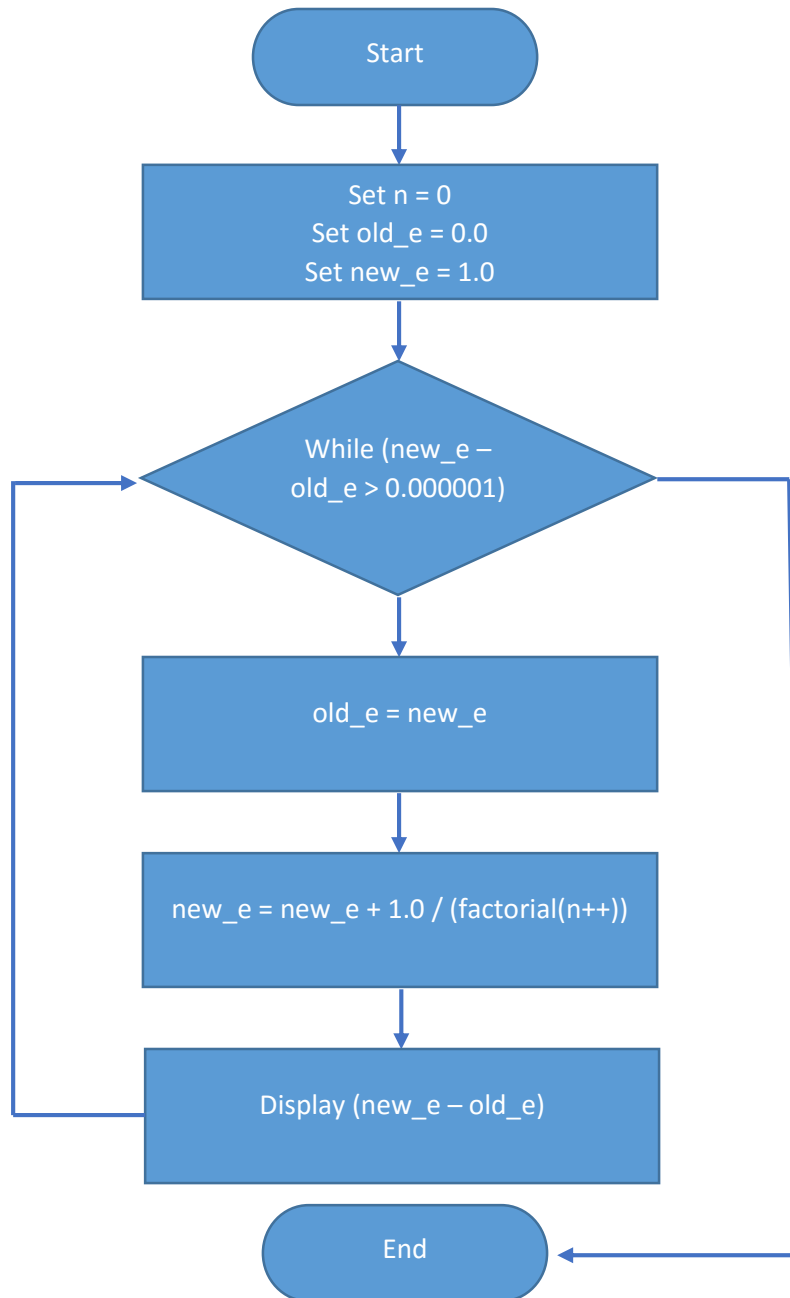
## Output Display

$N = 2$	$e(1) = 2$	$e(2) = 2.5$	$\text{delta} = 0.5$
$N = 3$	$e(2) = 2.5$	$e(3) = 2.67$	$\text{delta} = 0.17$
$N = 4$	$e(3) = 2.667$	$e(4) = 2.708$	$\text{delta} = 0.041$
$N = 5$	$e(4) = 2.7083$	$e(5) = 2.7167$	$\text{delta} = 0.0084$
$N = 6$	$e(5) = 2.71667$	$e(6) = 2.71805$	$\text{delta} = 0.00138$
$N = 7$	$e(6) = 2.71805$	$e(7) = 2.71825$	$\text{delta} = 0.00020$
$N = 8$	$e(7) = 2.71825$	$e(8) = 2.71827$	$\text{delta} = 0.00002$
$N = 9$	$e(8) = 2.71827$	$e(9) = 2.71828$	$\text{delta} = 0.00001$
$N = 10$	$e(9) = 2.7182815$	$e(10) = 2.7182818$	$\text{delta} = 0.0000003$

# Structure Chart



# Flowchart for Main



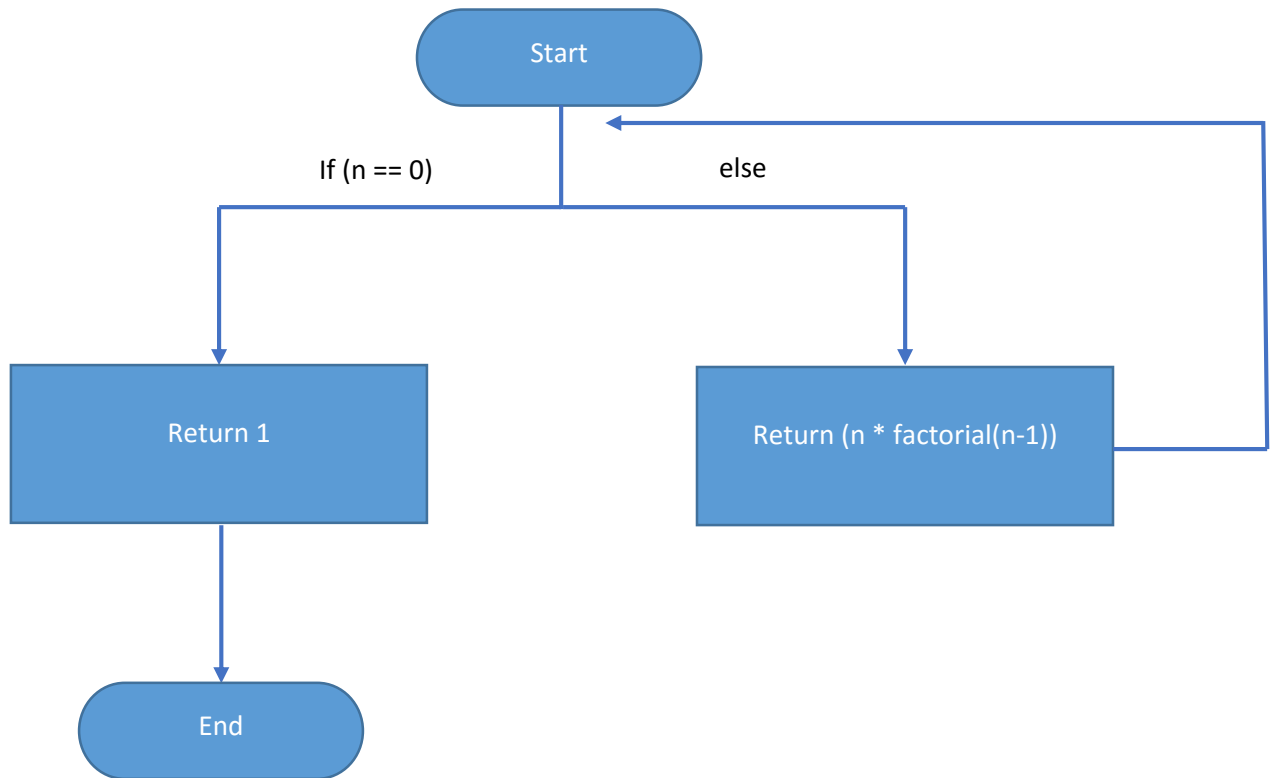
# Pseudo Code for Main

Start of algorithm for Main

1. Define variables  $n = 0$ ,  $old\_e = 0$ ,  $new\_e = 1$
2. While( $new\_e - old\_e > 0.000001$ )
  - $old\_e = new\_e$
  - $new\_e = new\_e + 1.0 / (\text{factorial}(n++))$
  - Display output
3. Display final output

End of algorithm for Main

# Flowchart for Factorial



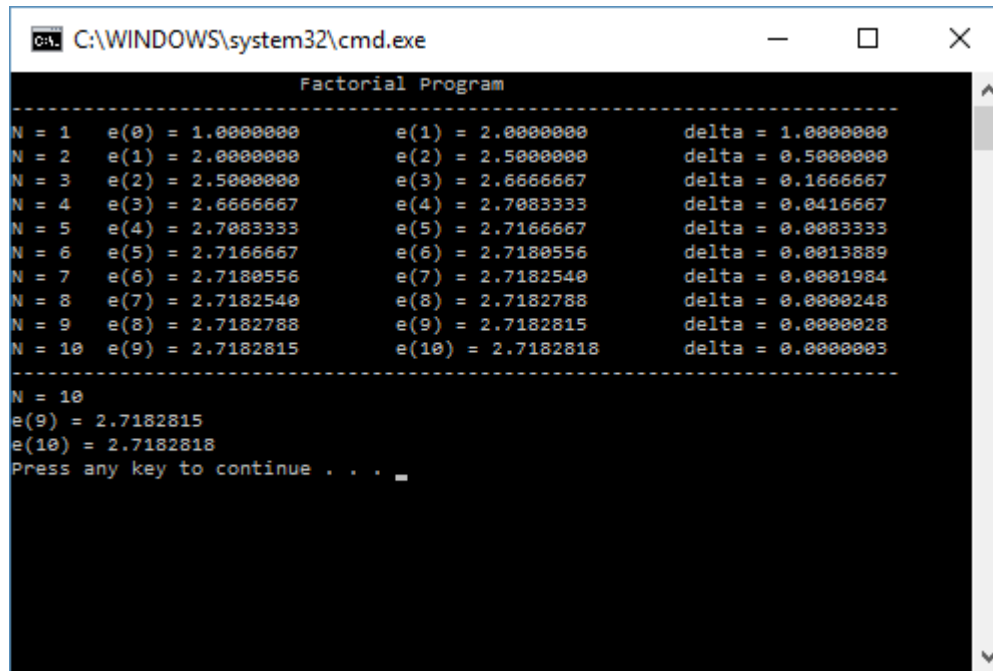
# Pseudo Code for Factorial

Start of algorithm for Factorial

1. If ( $n == 0$ )
  - return 1
2. Else
  - return( $n * \text{factorial}(n-1)$ )

End of algorithm for Factorial

# Output



```
C:\WINDOWS\system32\cmd.exe

Factorial Program
-----
N = 1  e(0) = 1.0000000  e(1) = 2.0000000  delta = 1.0000000
N = 2  e(1) = 2.0000000  e(2) = 2.5000000  delta = 0.5000000
N = 3  e(2) = 2.5000000  e(3) = 2.6666667  delta = 0.1666667
N = 4  e(3) = 2.6666667  e(4) = 2.7083333  delta = 0.0416667
N = 5  e(4) = 2.7083333  e(5) = 2.7166667  delta = 0.0083333
N = 6  e(5) = 2.7166667  e(6) = 2.7180556  delta = 0.0013889
N = 7  e(6) = 2.7180556  e(7) = 2.7182540  delta = 0.0001984
N = 8  e(7) = 2.7182540  e(8) = 2.7182788  delta = 0.0000248
N = 9  e(8) = 2.7182788  e(9) = 2.7182815  delta = 0.0000028
N = 10 e(9) = 2.7182815  e(10) = 2.7182818  delta = 0.0000003
-----
N = 10
e(9) = 2.7182815
e(10) = 2.7182818
Press any key to continue . . .
```



# User Instructions

This program requires no input from the user. Simply run the program and it will calculate the difference between two sequential factorial numbers until the difference is less than 0.000001.

# Comment

This lab was real nice, quick and easy. It was cool to see how a recursive function works and it is interesting that a function can call itself. I'm interested in how I am going to use this new technique in the future.