```
% APC 524 - Numerical Algorithms
% Homework #1

% Problem 5
clear all; close all; clc

% calculate the first term (n=1)
n(1) = 1;
diff = 1;
S(1) = (1+1/n)^n;
% intialize a counter to increment n by *10 each time
count = 1;
while diff>0
    n(count+1) = 10^count;
    % calculate new value of S
    S(count+1) = (1+1/n(count+1))^n(count+1);
    % compare new S(count+1) with old S(count) rounding each to 12
    % significant figures
    diff = abs(round(S(count+1), 12, 'significant') - ...
        round(S(count), 12, 'significant'));
    count=count+1;
end

n_stop = n(end)
S_final = S(end)

table = array2table([n', round(S, 12, 'significant')']);
table.Properties.VariableNames(1:2) = {'n', 'S'};
table
```

```
n_stop =

     1.000000000000000e+14


S_final =

   2.716110034087023


table =

  15×2 table

          n                S
    _____________    _____________

                1                2
               10     2.5937424601
              100    2.70481382942
             1000    2.71692393224
```

```
         10000    2.71814592682
        100000    2.71826823719
       1000000     2.7182804691
      10000000    2.71828169413
     100000000    2.71828179835
    1000000000    2.71828205201
   10000000000    2.71828205323
  100000000000    2.71828205336
 1000000000000    2.71852349604
10000000000000    2.71611003409
100000000000000    2.71611003409
```

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