Using Loop Controls to Compute Factorials

In lab last week, we learned how to use Do, For and While statements to sum a series of numbers. Our last class exercise asked us to use each type of statement to compute 10!

Mathematica has a built in factorial function, which is simply:

In[347]= 10!
Out[347]= 3628800

and even a double factorial:

In[348]= 10!!
Out[348]= 3840

(where n!! = n (n - 2) (n - 4) ...).
Below are the short codes showing how to compute 10! using Do, For, While statements:

Using a Do Loop. (The format of a Do Loop is Do[expr, {i, i_{max}]}
Clear[fact]
fact = 1;
(* This is the initialization step *)
Do[fact = fact n, {n, 1, 10}]
Print[fact]
3628800

Using a For statement: (The format is For[start, test, incr, body])
Clear[fact]
For[fact = 1; i = 1, i < 11, i++, fact = fact * i]
Print[fact]
3628800

Note that in the code above we have two elements in the start portion of the For statement. These two elements are separated by a semi-colon. In other words, everything up to the first comma is part of start.

Using a While statement (* While[test, body] *)
Clear[fact]
i = 1; fact = 1; While[i < 11, fact = fact * i; i++]
Print[fact]
3628800