CS110: Computer Programming Lab
Department of CSE
IIT, Guwahati

Module 01 Stage 02 Exercise 05

Please read Module 01 Stage 02 drills before you work on this problem.

Problem description

The following infinite series is normally credited to Sir Isaac Newton (circa 1730)

$$\pi = 6\left(\frac{1}{2} + \frac{1}{2 \cdot 3 \cdot 2^3} + \frac{1 \cdot 3}{2 \cdot 4 \cdot 5 \cdot 2^5} + \frac{1 \cdot 3 \cdot 5}{2 \cdot 4 \cdot 6 \cdot 7 \cdot 2^7} + \cdots\right)$$

You are required to write a series of assignment statements to compute and print the value of pi that is correct to 5 places after the decimal.

Guiding instructions

In this computation, you may wish to use patterns in the series to ease your computational and program writing efforts. As is clear each new member in the series is based on three "patterns". Select a set of variables to track the pattern values; the value of the next version of each pattern is based on the value of its current version.

You must also use the pattern 2^n to estimate the number of members in the series that you should add to get the required precision of the final answer. If you add too few members the final answer may not be within the specified tolerance range. If you use too many then there is no real benefit accruing to the result.