Write a Matlab programs to calculate Bessel’s series \( J_0(x) \) and \( J_1(x) \) by receiving the value of the argument, \( x \), as input. The mathematical formulas are

\[
J_0(x) = S_0 + S_1 + S_2 + S_3 + S_4 + \ldots \\
= 1 - \frac{\left(\frac{1}{2}x\right)^2}{(1!)^2} + \frac{\left(\frac{1}{2}x\right)^4}{(2!)^2} - \frac{\left(\frac{1}{2}x\right)^6}{(3!)^2} + \frac{\left(\frac{1}{2}x\right)^8}{(4!)^2} - \ldots \\
J_1(x) = T_0 + T_1 + T_2 + T_3 + T_4 + \ldots \\
= \frac{1}{2}x - \frac{\left(\frac{1}{2}x\right)^3}{1^2 \cdot 2} + \frac{\left(\frac{1}{2}x\right)^5}{1^2 \cdot 2^2 \cdot 3} - \frac{\left(\frac{1}{2}x\right)^7}{1^2 \cdot 2^2 \cdot 3^2 \cdot 4} + \ldots
\]

- Obtain the recurrence relationship of the series and use them for the program.
- It is not difficult to sum both series using the same loop.
- Do the summation for 10 terms.
- For checking purpose, \( J_0(0) = 1.0; J_0(0.5) = 0.9384698; J_0(2) = 0.22389078; J_1(0) = 0.0; J_1(0.5) = 0.2422685; J_1(2) = 0.5767248. \)
- Create a diary file which contains the program(s) and the sample executions and send it through email to ce108@usc.edu.