Lab 9

Submit your program before the deadline.

1. The trigonometric function *cosine* has the following Taylor expansion

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \frac{x^{10}}{10!} - \dots$$

Implement a procedure `cosine` in MIPS assembly language that, given a value x in radian, approximates `cos(x)` using the expansion above. You can set the last term to $\frac{x^{14}}{14!}$. The procedure takes the argument x in register `$f12` and returns the result in register `$f0`. All floating point numbers are single precision. Your program should prompt the user for x in degree (so your program should convert x to radian first) and print out cos(x). For example, for $x = 32$, it should output 0.8480481, i.e., $cos(32) = 0.8480481$. Your program should continue prompting until the user inputs -1. Do not forget to follow the MIPS convention.

pi = 3.14159265359

You can implement your own procedures for power and factorial.