CMSC/AMSC 460 Fall 2007
Homework 3
Due Tuesday, October 16, before class begins
15 points

The assignment is to find the area of the elephant `elephant.tif`.

Let's agree on some conventions. If `e = imread('elephant.tif')`, then `e` is an array that is 289×417. Define the area of the elephant to be

$$I(f) = \frac{1}{289 * 417} \int_0^{417} \int_0^{289} f(x, y)\ dy\ dx,$$

where $f(x, y) = 1$ if (x, y) is inside the elephant and zero otherwise.

1. (3) Estimate $I(f)$ using nested calls to `quad`.
2. (3) Estimate $I(f)$ using `dblquad`.
3. (3) Estimate $I(f)$ using one additional method, your choice.
4. (6) Discuss your estimates. Include
   - A table of your estimates, their uncertainty, and their cost. Measure cost by either time (`tic` and `toc`) or number of function evaluations.
   - How you decided on the additional method.
   - Why each method works well or does not work well.
   - Your assessment of sources of error and which estimate is best.

For full credit: Hand in

- Your discussion.
- A listing of your well-documented program.
  (Refer to Homework 2 for documentation standards.)