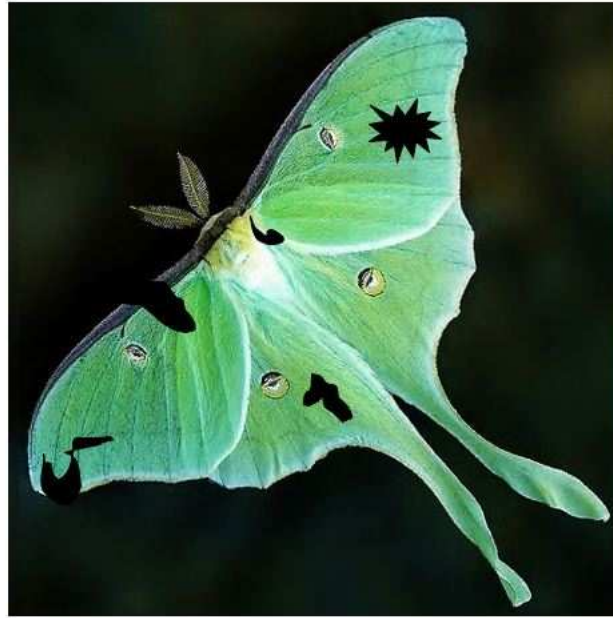


CS 2104 Homework Assignment 6. "Symmetry". Individual work

1. (15 points. "Image Recovery".)



Shown above is the only remaining color photo of an extinct butterfly species *lepidoptera Darwinica*. It was taken by C. Darwin on his last voyage to the Galapagos, but as you can see the time was not kind to the image: black areas on the wings are missing.

Task: Propose an algorithm that would restore the image. Use reasonable assumptions about butterflies. Do not code anything, just describe the main idea.

2. (15 points) How many N -bit strings contain anywhere from none to $N/2$ zeros (inclusive)? N is even. Hint: Use Mississimetry.
3. (20 points) A subset of vertices of 5-dimensional (hyper) cube is used in an error detection code. Only those vertices that contain an odd number of zeros code for "words". For example, (00000), (01111), or (00011) are code words, while (11100) or (11111) are not. How many such code words are there? Now generalize to N dimensions, where N is odd. Give a general solution.

Submission Strictly follow the "General Assignment Guidelines" (individual assignment) on the course web-site.