Introduction to Python Programming
Mini Project

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Problem 1. Develop a Python program capable of reading a file, named `cube.dat`, where each line contains a single digit, 0 or 1. The total number of lines in the file represents a cube, specifically n^3, for example, 64, 32768, 262144, etc. Your task is to create a 3D NumPy array from this data and use Matplotlib to plot three distinct 3D visualizations:

- Image_1: The complete cube.
- Image_2: A cube displaying only the '1' elements.
- Image_3: A cube showing only the '0' elements.

The program should be adaptable to handle files of any size, given that the size will always be a perfect cube (n^3). The output should be three PNG images saved with a dpi of 300, named `full.png` (for Image_1), `1.png` (for Image_2), and `0.png` (for Image_3), respectively. The program should not display the images on the screen. Examples of the outputs for 48^3 are shown in Fig. 1.
Hint: To read the files, you might use a piece of (incomplete) code such as the following

```
def read_file(name,nx,ny,nz):
    file = open(name,'r')
    all_lines = file.readlines()
    count = 0
    all_node = zeros([nx,ny,nz],dtype='i')
    for i in range(nx):
        for j in range(ny):
            for b in range(nz):
                line = all_lines[count]
                count += 1
                # ... complete the rest ...
```

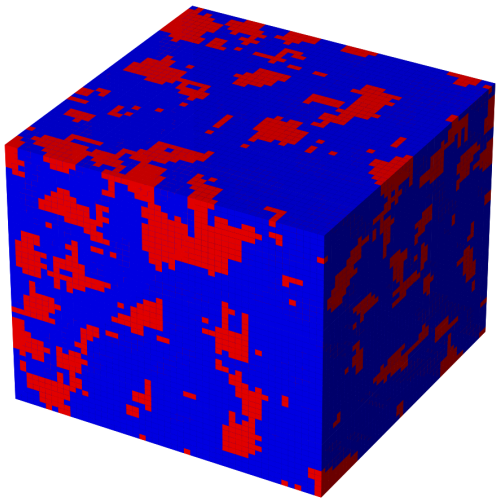

Figure 1: Example for `full.png`

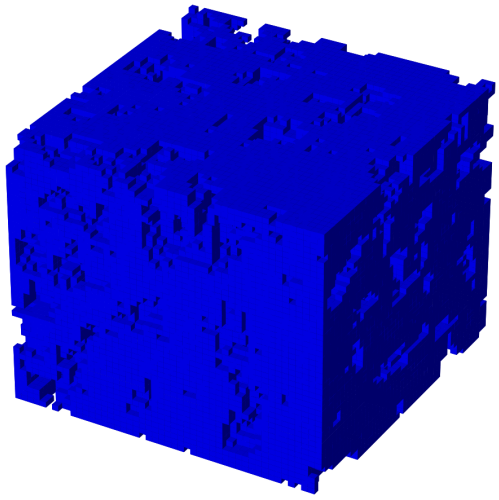

Figure 2: Example for `1.png`

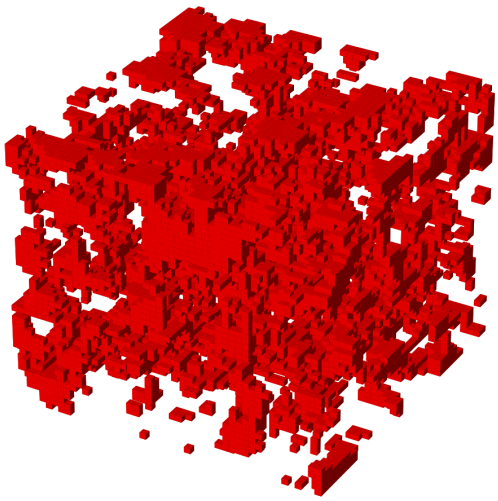

Figure 3: Example for `0.png`