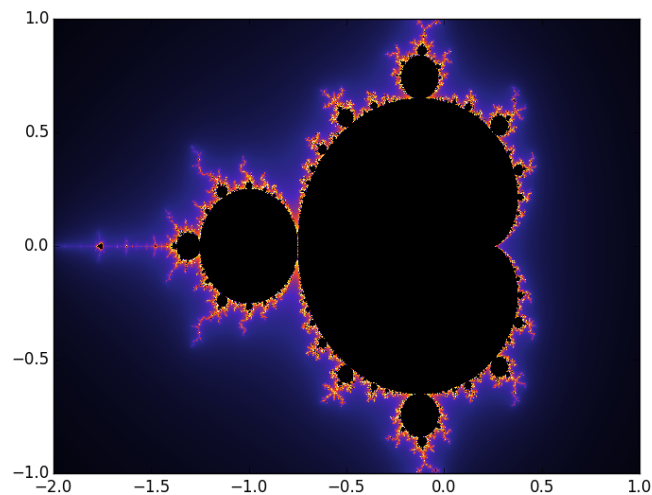


Lab 10: Improve the runtime of the code using Cython

Due date: Thursday April 16, 11:59pm



Take the code from the website (mandelbrot.py) and do the following:

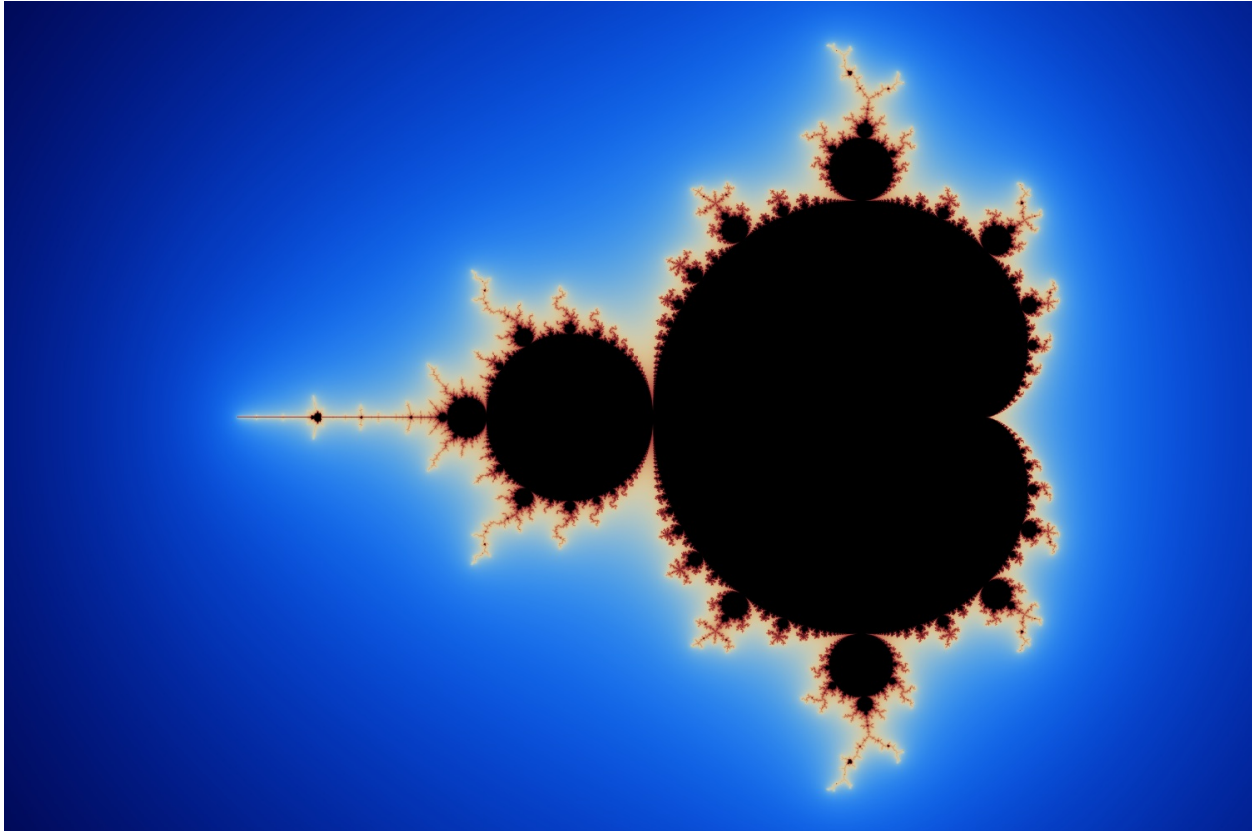
- try to understand what is going on, use the Wikipedia entry about the Mandelbrot Set as a guide
- run the code, you can experiment with different colormaps (see the commented examples in `create_jetcolorlist`)
- improve the run time by putting some parts into Cython
- report speed up and time for your machine
- explore some regions like the 'seahorse' or others by zooming into the picture (recalculating using different parts of the map, for the full set the boundaries are set to $-2, 1, -1, 1$)
- Send a PDF with pictures and speedup reports.

For fun look at this (<http://preshing.com/20110926/high-resolution-mandelbrot-in-obfuscated-python/>) on the next page. This is a working python code that generates the picture below, but we will use our code for this lab :-).

```

-                                     = (
                                     255,
                                     lambda
                                     ,B,c
                                     :c and Y(V*V+B,B, c
                                     -1)if(abs(V)<6)else
(                                     2+c-4*abs(V)**-0.4)/i
) ;v, x=1500,1000;C=range(v*x
);import struct;P=struct.pack;M,\
j = '<QIIHHH',open('M.bmp','wb').write
for X in j('BM'+P(M,v*x*3+26,26,12,v,x,1,24))or C:
i ,Y=_;j(P('BBB',*(lambda T:(T*80+T**9
*i-950*T **99,T*70-880*T**18+701*
T **9 ,T*i**(1-T**45*2)))(sum(
[ Y(0,(A%3/3.+X%v+(X/v+
A/3/3.-x/2)/1j)*2.5
/x -2.7,i)**2 for \
A in C
[:9]])
/9)
) )

```



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