

## plots\_hw2

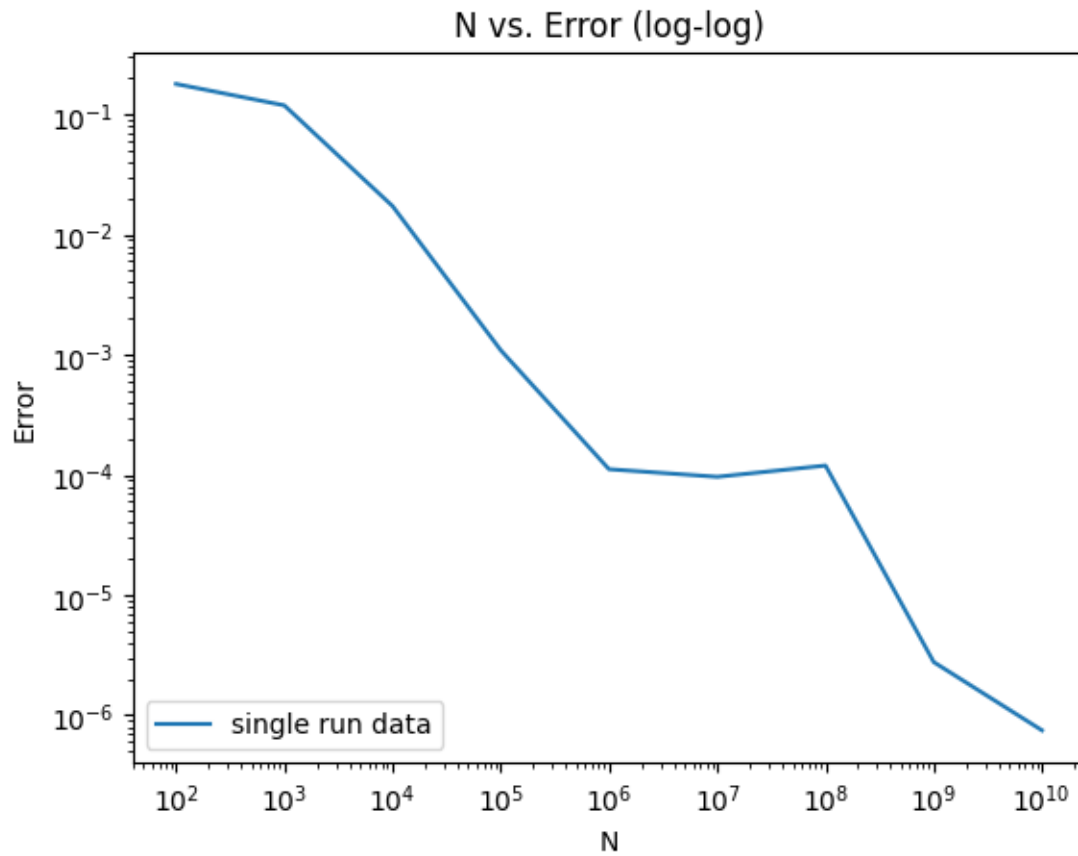
November 6, 2023

```
[3]: import numpy as np
      from matplotlib import pyplot as plt

      data_1 = np.loadtxt("hw2_1c_mypc.dat")

      plt.loglog(data_1[:,0], data_1[:,1],label='single run data')
      plt.legend(loc=3)
      plt.xlabel("N")
      plt.ylabel("Error")
      plt.title('N vs. Error (log-log)')
      #plt.savefig("d")
```

```
[3]: Text(0.5, 1.0, 'N vs. Error (log-log)')
```

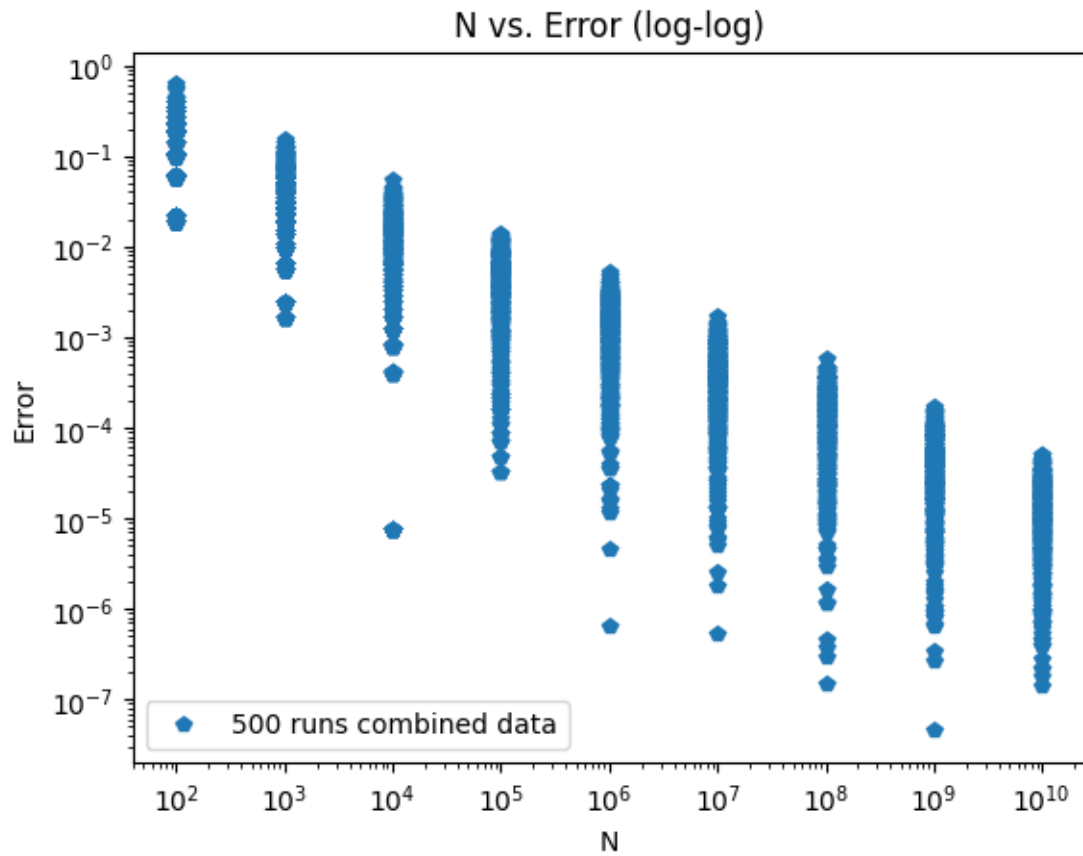


```
[4]: import numpy as np
from matplotlib import pyplot as plt

data_2 = np.loadtxt("hw2_1b_parallel.dat")

plt.loglog(data_2[:,0], data_2[:,1], 'p', label='500 runs combined data')
plt.legend(loc=3)
plt.xlabel("N")
plt.ylabel("Error")
plt.title('N vs. Error (log-log)')
#plt.savefig("e")
```

```
[4]: Text(0.5, 1.0, 'N vs. Error (log-log)')
```



```
[5]: import numpy as np
import matplotlib.pyplot as plt

data_2 = np.loadtxt('hw2_1b_parallel.dat')

N_i = data_2[:, 0]
error = data_2[:, 1]

unique_N = []
mean_error = []

for N in np.unique(N_i):
    error_N = error[N_i == N]
    mean_error_N = np.mean(error_N)
    unique_N.append(N)
    mean_error.append(mean_error_N)

unique_N = np.array(unique_N)
mean_error = np.array(mean_error)
```

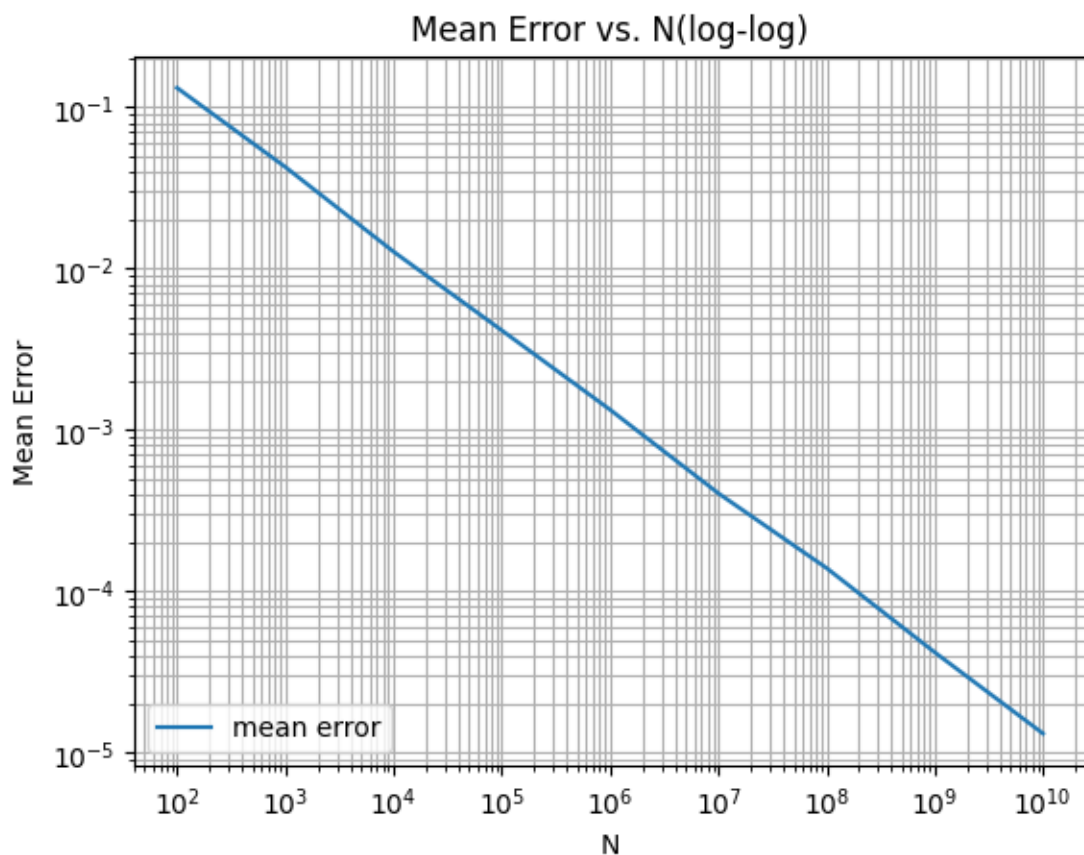
```

data_to_save = np.column_stack((unique_N, mean_error))
np.savetxt('new_data_file.dat', data_to_save, delimiter=' ', comments='')

plt.loglog(unique_N, mean_error, label='mean error')
plt.legend(loc=3)
plt.grid(True, which='both', axis='both')
plt.xlabel('N'); plt.ylabel('Mean Error'); plt.title('Mean Error vs. N
↳N(log-log)')
#plt.savefig("f")

```

[5]: Text(0.5, 1.0, 'Mean Error vs. N(log-log)')



```

[8]: import numpy as np
import matplotlib.pyplot as plt

data_1 = np.loadtxt("hw2_1c_mypc.dat")
data_2 = np.loadtxt("hw2_1b_parallel.dat")
#data_trap = np.loadtxt("error_trap.dat")

```

```

N_i = data_2[:, 0]
error = data_2[:, 1]

unique_N = []
mean_error = []

for N in np.unique(N_i):
    error_N = error[N_i == N]
    mean_error_N = np.mean(error_N) #calculates mean error for each value of 'N'
    unique_N.append(N)
    mean_error.append(mean_error_N)

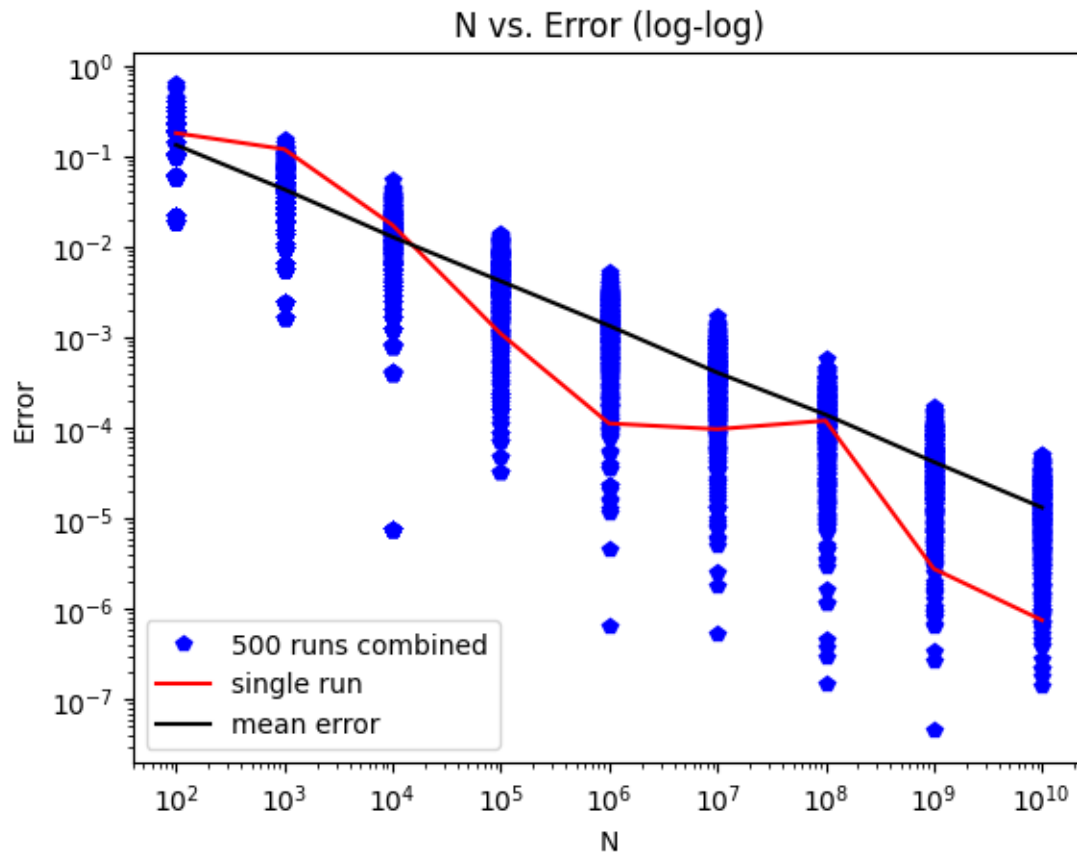
unique_N = np.array(unique_N)
mean_error = np.array(mean_error)

plt.loglog(data_2[:, 0], data_2[:, 1], 'p', label='500 runs_
↳combined', color='blue')
plt.loglog(data_1[:, 0], data_1[:, 1], label='single run', color='red')
#plt.loglog(data_trap[:, 0], data_trap[:, 1], label='trap data', color='green')
plt.loglog(unique_N, mean_error, label='mean error', color='black')

plt.legend(loc=3)
plt.xlabel("N")
plt.ylabel("Error")
plt.title('N vs. Error (log-log)')

plt.savefig("b")

```

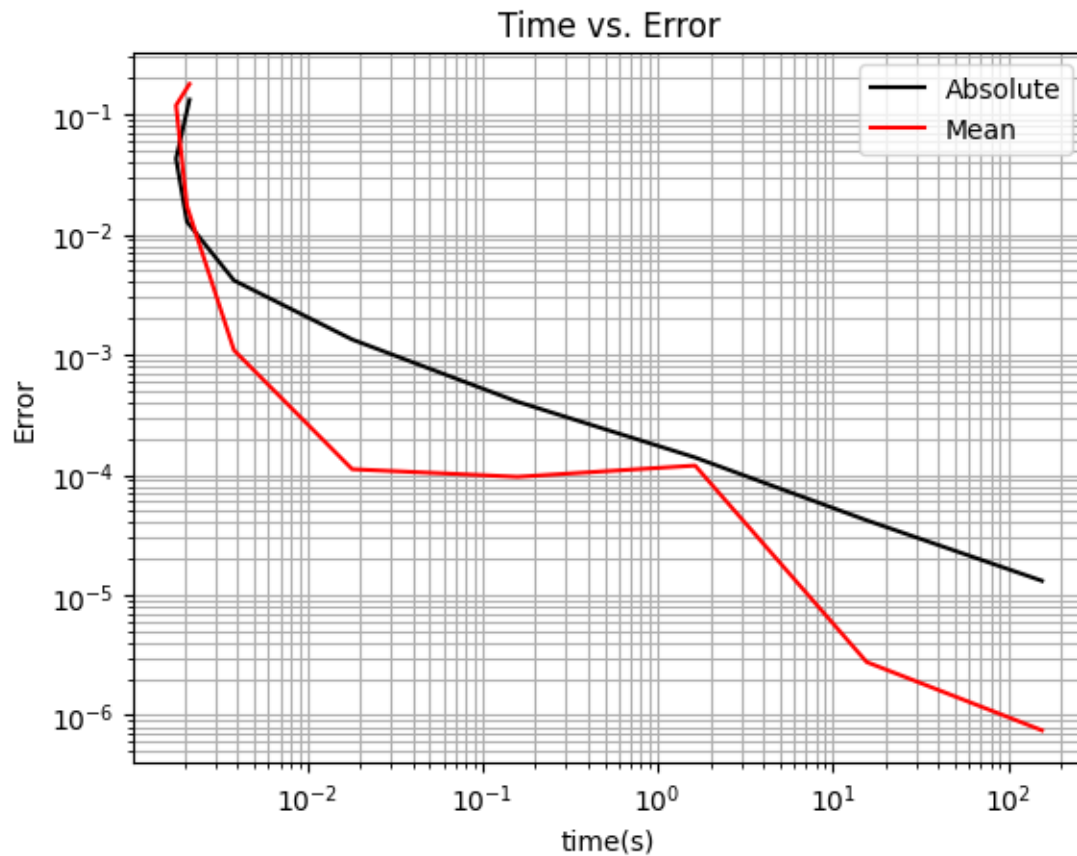


```
[16]: import numpy as np
from matplotlib import pyplot as plt

data_1 = np.loadtxt("timing_mypc.dat")
data_2 = np.loadtxt("hw2_1c_mypc.dat")
data_3 = np.loadtxt("hw2_1c_mean.dat")

plt.loglog(data_1[:,1], data_3[:,1], label='Absolute', color='black')
plt.loglog(data_1[:,1], data_2[:,1], label='Mean', color='red')

plt.legend(loc=1)
plt.xlabel("time(s)")
plt.ylabel("Error")
plt.grid(True, which='both', axis='both')
plt.title('Time vs. Error')
plt.savefig("c")
```

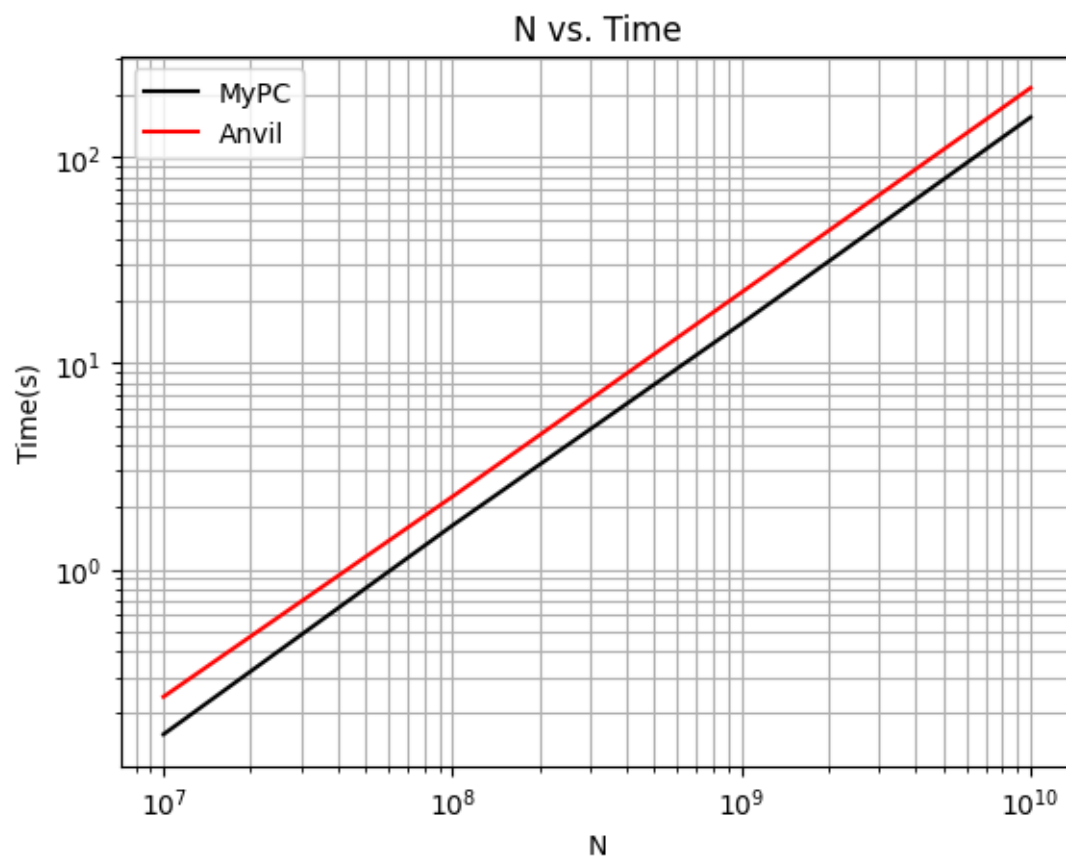


```
[12]: import numpy as np
from matplotlib import pyplot as plt

data_1 = np.loadtxt("timing_mypc.dat")
data_2 = np.loadtxt("timing_anvil.dat")
#data_3 = np.loadtxt("hw2_1c_mean.dat")
#data_4 = np.loadtxt("hw2_1c_anvil.dat")

plt.loglog(data_1[5:,0], data_1[5:,1], label='MyPC', color='black')
plt.loglog(data_2[5:,0], data_2[5:,1], label='Anvil', color='red')

plt.legend(loc=2)
plt.xlabel("N")
plt.ylabel("Time(s)")
plt.grid(True, which='both', axis='both')
plt.title('N vs. Time')
plt.savefig("2")
```



[ ]: