speedup

June 17, 2022

```
[1]: import pandas as pd
     import matplotlib.pyplot as plt
     import seaborn as sns

     sns.set_theme()
```

0.1 Read data

```
[2]: master_df = None

     for i in range(1, 65):
         filename = '17-06-2022/seq/master-' + str(i) + '-threads.csv'
         new_data = pd.read_csv(filename)
         new_data['threads'] = i
         new_data['branch'] = 'master'
         master_df = pd.concat([master_df, new_data], ignore_index = True)

     new_algorithm_df = None

     for i in range(1, 65):
         filename = '17-06-2022/seq/new-algorithm-' + str(i) + '-threads-10us.csv'
         new_data = pd.read_csv(filename)
         new_data['threads'] = i
         new_data['branch'] = 'new-algorithm'
         new_algorithm_df = pd.concat([new_algorithm_df, new_data], ignore_index =␣
      ↪True)
```

0.2 Prepare data

```
[3]: def calculate_speedups(dataframe):
         single_core_df = dataframe[dataframe['threads'] == 1]
         multi_core_df = dataframe[dataframe['threads'] > 1]

         speedups = {'name': [], 'speedup': [], 'cores': []}

         for algorithm in set(dataframe['name']):
```

```python
        algorithm_single_core_df = single_core_df[single_core_df['name'] ==␣
 ↪algorithm]
        single_core_mean = algorithm_single_core_df['wall_clock_time_us'].mean()

        for thread in set(multi_core_df['threads']):
            algorithm_multi_core_df = multi_core_df[(multi_core_df['name'] ==␣
 ↪algorithm) &
                                                    (multi_core_df['threads']␣
 ↪== thread)]

            multi_core_mean = algorithm_multi_core_df['wall_clock_time_us'].
 ↪mean()

            speedup = single_core_mean / multi_core_mean

            speedups['name'].append(algorithm)
            speedups['speedup'].append(speedup)
            speedups['cores'].append(thread)

    return speedups


speedups_master = calculate_speedups(master_df)
speedups_new_algorithm = calculate_speedups(new_algorithm_df)

master = pd.DataFrame(data=speedups_master)
master['branch'] = 'master'

new_algorithm = pd.DataFrame(data=speedups_new_algorithm)
new_algorithm['branch'] = 'new-algorithm'

df = pd.concat([master, new_algorithm], ignore_index = True)
```

0.3 Plot speedup curves

```python
[4]: for algorithm in set(df['name']):
        fig, ax = plt.subplots(figsize=(15, 5))
        df_to_plot = df[df['name'] == algorithm]
        sns.lineplot(x='cores', y='speedup', hue='branch', data=df_to_plot, ax=ax);

        ax.set_title(algorithm)
        ax.set_ylabel('speedup')
        ax.set_xlabel('number of threads')
```

NBody sequential

Life - sequential generation