Analysis

May 16, 2023

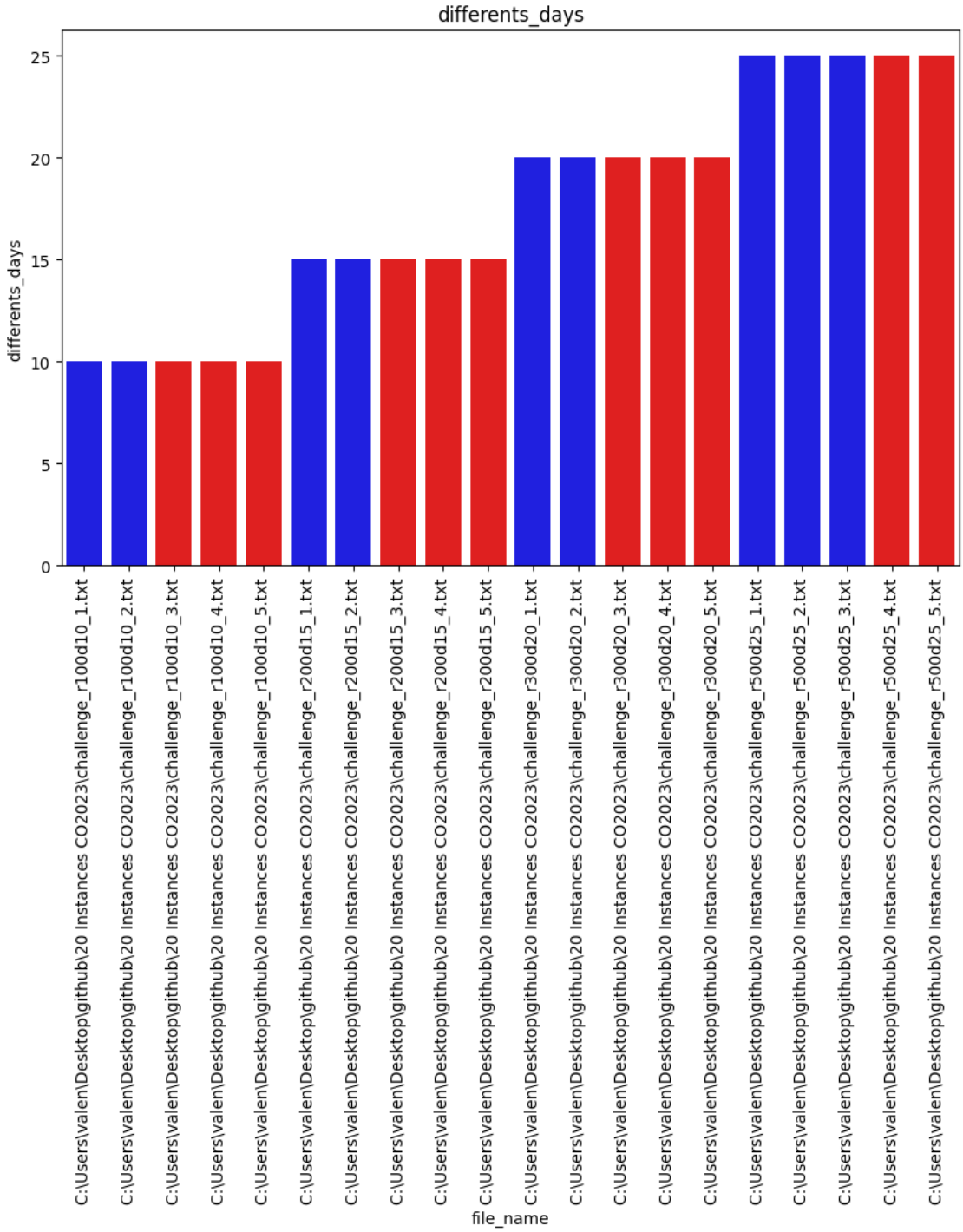
[1]:
```
import re
import os
import subprocess
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# folder with instances
path = r"C:\Users\valen\Desktop\github\20 Instances CO2023"

# Solution far away from the score of the first team
worse_solutions = ['C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r100d10_3.txt',
                    'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r100d10_4.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r100d10_5.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r200d15_3.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r200d15_4.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r200d15_5.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r300d20_3.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r300d20_4.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r300d20_5.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r500d25_4.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r500d25_5.txt']

# Solution where I'm first
best_solutions = ['C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r100d10_1.txt',
```

```
                    'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r100d10_2.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r200d15_1.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r200d15_2.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r200d15_5.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r300d20_3.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r300d20_4.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r300d20_5.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r500d25_4.txt',
                   'C:\\Users\\valen\\Desktop\\github\\20 Instances␣
 ↪CO2023\\challenge_r500d25_5.txt']
# Get name of .txt files
def obtenir_noms_fichiers_texte(dossier):
    noms_fichiers = []
    for nom_fichier in os.listdir(dossier):
        if nom_fichier.endswith(".txt"):
            noms_fichiers.append(nom_fichier)
    return noms_fichiers

dossier = r"C:\Users\valen\Desktop\github\20 Instances CO2023"

noms_fichiers_texte = obtenir_noms_fichiers_texte(dossier)

paths = [path + "\\" + x for x in noms_fichiers_texte ]


def list_to_dict(lst):
        dictionary = {}
        for element in lst:
            key = element[0]
            values = list(element[1:])
            dictionary[key] = values
        return dictionary

# Extract the data
def parse_file(path):
    try :
        with open(path, "r") as file:
            filetext = file.read()
```

```
    except Exception as e:
        print(e)
        return

    dataset = ""
    name = ""
    days = 0
    capacity = 0
    max_trip_distance = 0
    depot_coordinate = 0
    vehicle_cost = 0
    vehicle_day_cost = 0
    distance_cost = 0
    tools = []
    coordinates = []
    requests = []

    for line in filetext.splitlines():
        if not line.strip():
            continue

        key, value = line.strip().split(" = ")
        if key == "DATASET":
            dataset = value
        elif key == "NAME":
            name = value
        elif key == "DAYS":
            days = int(value)
        elif key == "CAPACITY":
            capacity = int(value)
        elif key == "MAX_TRIP_DISTANCE":
            max_trip_distance = int(value)
        elif key == "DEPOT_COORDINATE":
            depot_coordinate = int(value)
        elif key == "VEHICLE_COST":
            vehicle_cost = int(value)
        elif key == "VEHICLE_DAY_COST":
            vehicle_day_cost = int(value)
        elif key == "DISTANCE_COST":
            distance_cost = int(value)
            break
    regex = r"^[0-9]+\s+[0-9]+\s+[0-9]+\s+[0-9]+$"
    regex_compiled = re.compile(regex, flags=re.MULTILINE)

    result = regex_compiled.findall(filetext)

    tools = []
```

```
    for line in result:
        tuple_of_numbers = tuple(map(int, line.split()))
        tools.append(tuple_of_numbers)

    tools = list_to_dict(tools)
    regex1 = r"^[0-9]+\s+[0-9]+\s+[0-9]+$"

    regex_compiled = re.compile(regex1, flags=re.MULTILINE)

    result = regex_compiled.findall(filetext)

    for line in result:
        tuple_of_numbers = tuple(map(int, line.split()))
        coordinates.append(tuple_of_numbers)

    regex2 = r"^[0-9]+\s+[0-9]+\s+[0-9]+\s+[0-9]+\s+[0-9]+\s+[0-9]+\s+[0-9]+$"

    regex_compiled = re.compile(regex2, flags=re.MULTILINE)

    result = regex_compiled.findall(filetext)

    for line in result:
        tuple_of_numbers = list(map(int, line.split()))

        requests.append(tuple_of_numbers)

    DISTANCE_COST = distance_cost
    VEHICLE_COST = vehicle_cost
    VEHICLE_DAY_COST = vehicle_day_cost
    CAPACITY = capacity
    filename = "sol_" + os.path.basename(path)
    return␣
 ↪filename,DISTANCE_COST,VEHICLE_COST,VEHICLE_DAY_COST,CAPACITY,dataset, name,␣
 ↪days, capacity, max_trip_distance, depot_coordinate, vehicle_cost,␣
 ↪vehicle_day_cost, distance_cost, tools, coordinates, requests

filename,DISTANCE_COST,VEHICLE_COST,VEHICLE_DAY_COST,CAPACITY,dataset, name,␣
 ↪days, capacity, max_trip_distance, depot_coordinate, vehicle_cost,␣
 ↪vehicle_day_cost, distance_cost, tools, coordinates, requests =␣
 ↪parse_file(paths[0])

#Get relevant data to compare
differents_days = []
differents_distance_cost = []
different_vehicule_cost = []
different_vehicule_day_cost = []
```

```
different_capacity = []
different_tools_mean_size = []
different_tools_mean_cost = []


for i in paths:
    filename,DISTANCE_COST,VEHICLE_COST,VEHICLE_DAY_COST,CAPACITY,dataset,␣
 ↪name, days, capacity, max_trip_distance, depot_coordinate, vehicle_cost,␣
 ↪vehicle_day_cost, distance_cost, tools, coordinates, requests = parse_file(i)
    differents_days.append(days)
    differents_distance_cost.append(DISTANCE_COST)
    different_vehicule_cost.append(vehicle_cost)
    different_vehicule_day_cost.append(VEHICLE_DAY_COST)
    different_capacity.append(CAPACITY)
    mean_1 = sum([tools[k][0] for k in tools]) / len(tools)
    mean_2 = sum([tools[k][2] for k in tools]) / len(tools)
    different_tools_mean_size.append(mean_1)
    different_tools_mean_cost.append(mean_2)


df = pd.DataFrame({
    'file_name': paths,
    'differents_days': differents_days,
    'differents_distance_cost': differents_distance_cost,
    'different_vehicule_cost': different_vehicule_cost,
    'different_vehicule_day_cost': different_vehicule_day_cost,
    'different_capacity': different_capacity,
    'different_tools_mean_size': different_tools_mean_size,
    'different_tools_mean_cost': different_tools_mean_cost
})


for column in df.columns[1:]:
    plt.figure(figsize=(10, 6))

    colors = ['red' if name in worse_solutions else 'blue' for name in␣
 ↪df['file_name']]

    sns.barplot(x='file_name', y=column, data=df, palette=colors)
    plt.xticks(rotation=90)
    plt.title(column)
    plt.show()
```


differents_days
differents_days
0
5
10
15
20
25
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_5.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_4.txt
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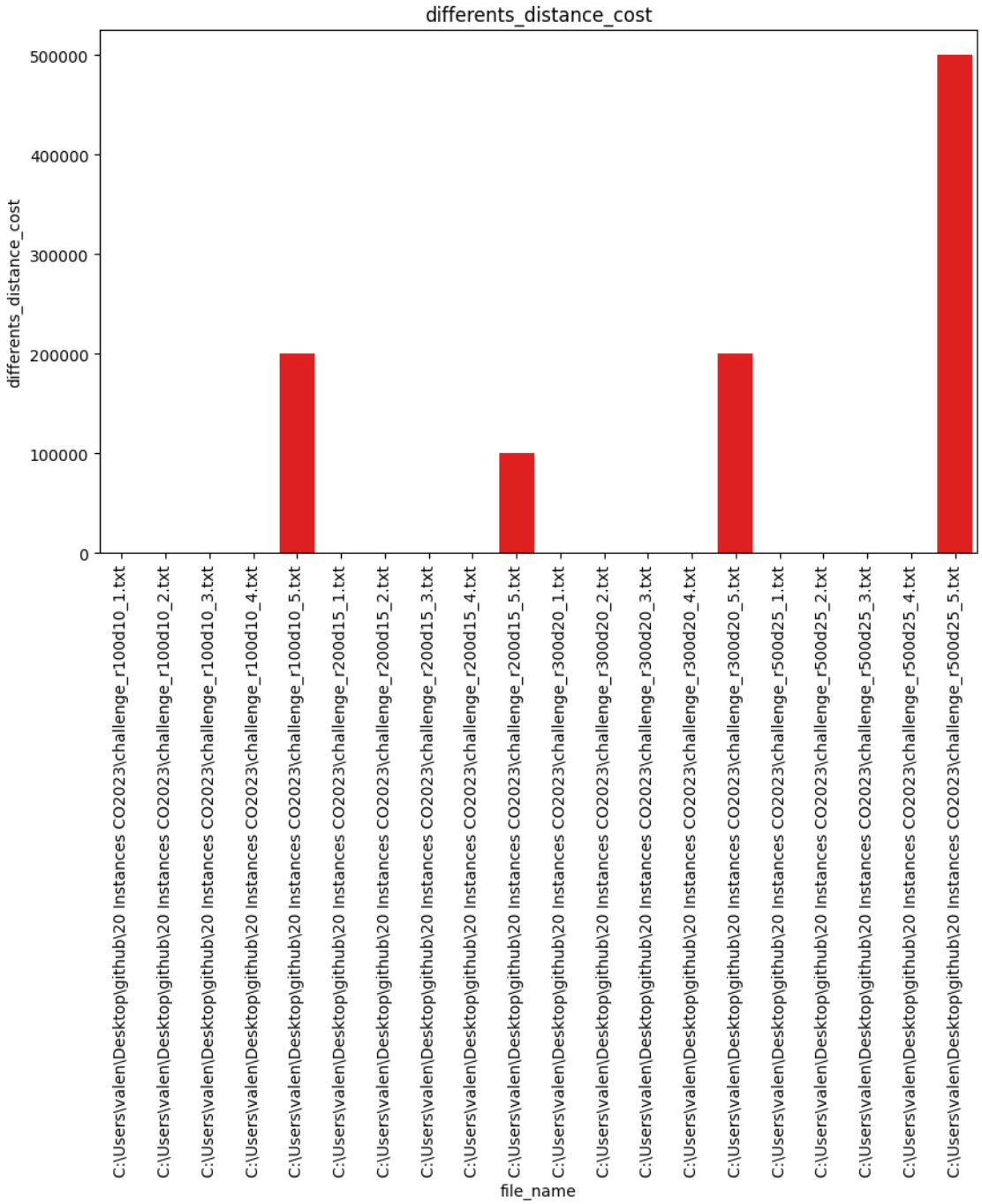
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r300d20_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r300d20_5.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_5.txt
file_name


differents_distance_cost
differents_distance_cost
0
100000
200000
300000
400000
500000
file_name
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_4.txt
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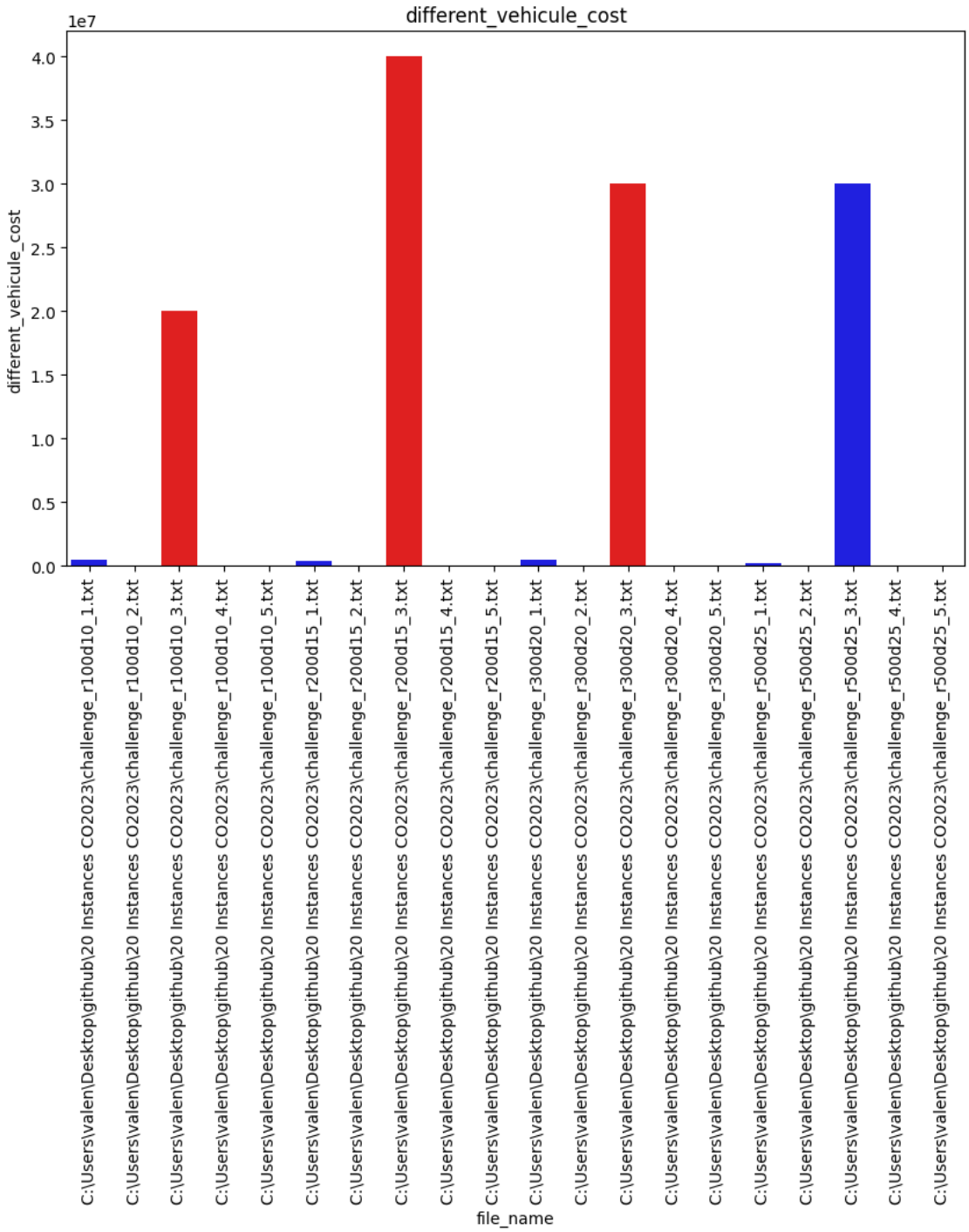
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r300d20_5.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_5.txt


different_vehicule_cost
1e7
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
different_vehicule_cost
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_5.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_3.txt
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C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r300d20_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r300d20_4.txt
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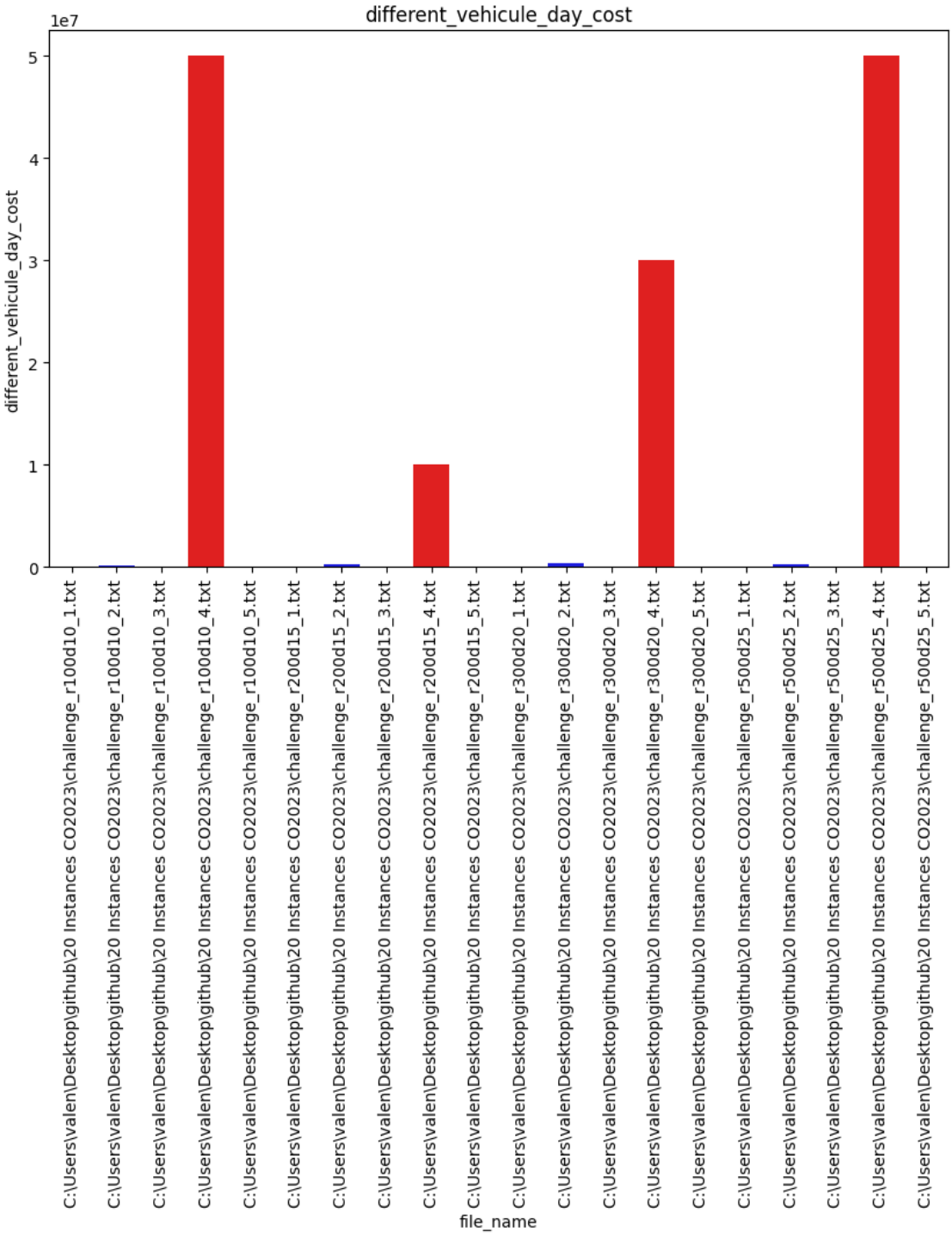
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_5.txt
file_name


different_vehicule_day_cost
1e7
5
4
3
2
1
0
different_vehicule_day_cost
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_3.txt
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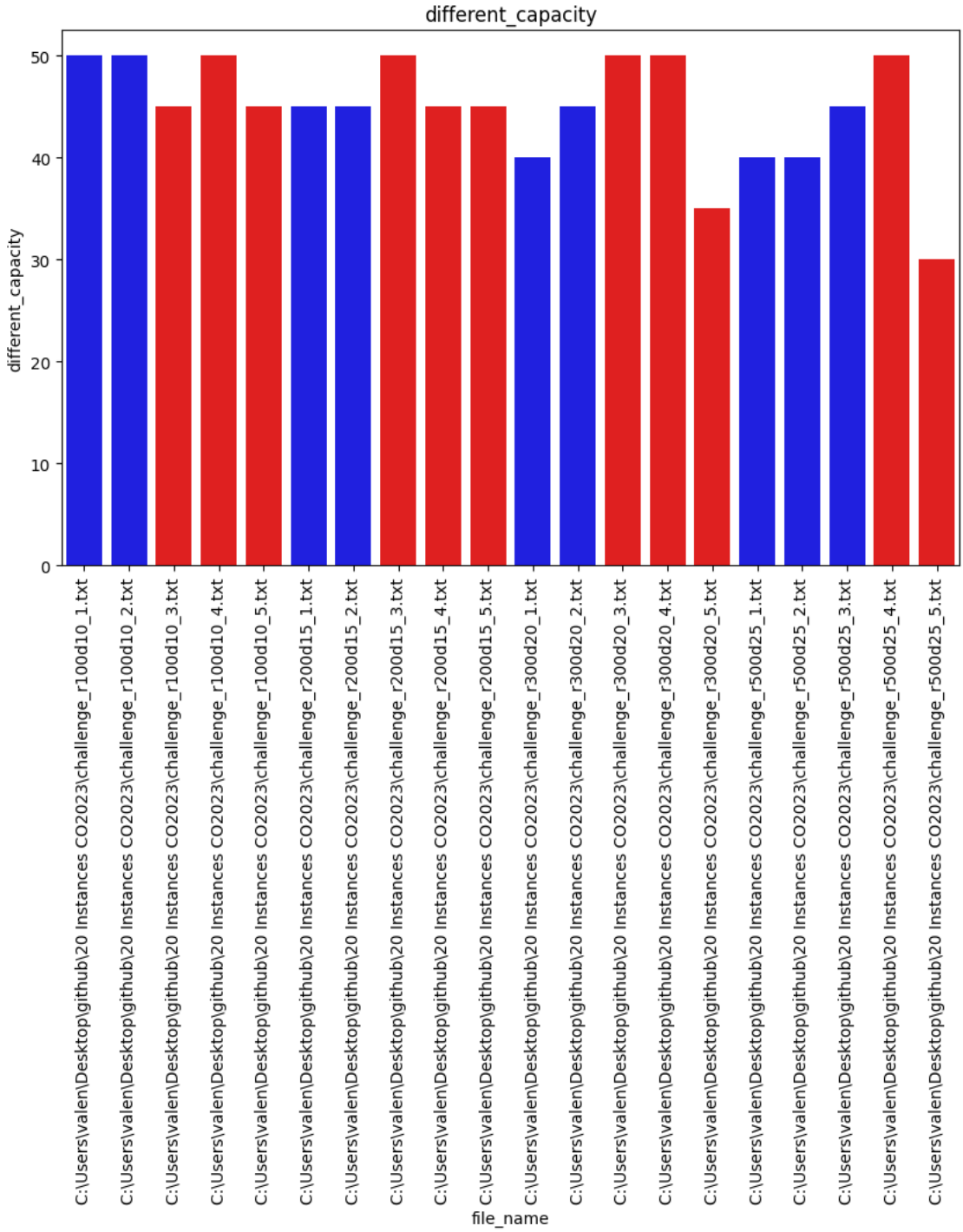
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_5.txt
file_name


different_capacity
different_capacity
0
10
20
30
40
50
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_2.txt
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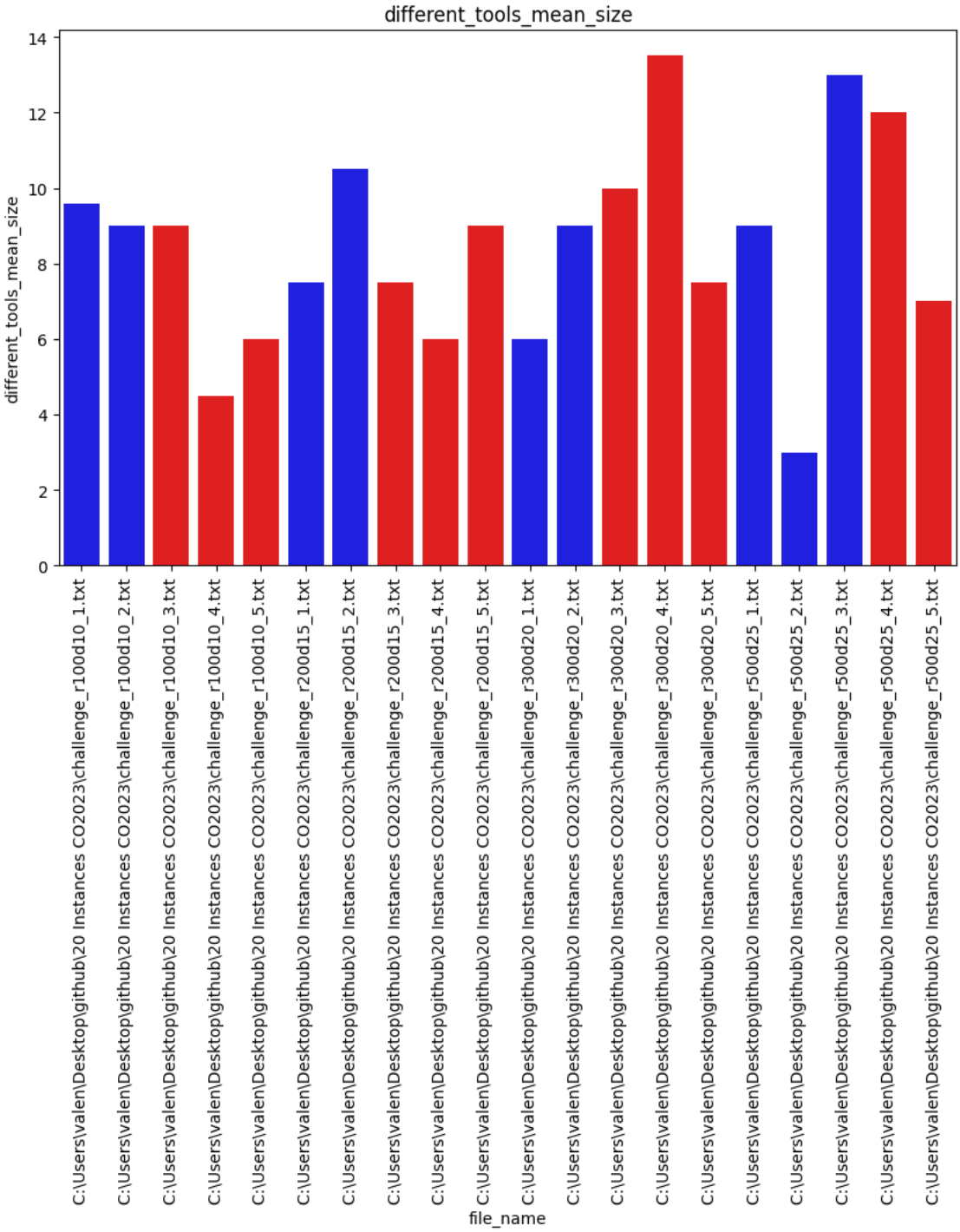
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_5.txt
file_name


different_tools_mean_size
different_tools_mean_size
file_name
0
2
4
6
8
10
12
14
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_2.txt
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C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r300d20_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r300d20_5.txt
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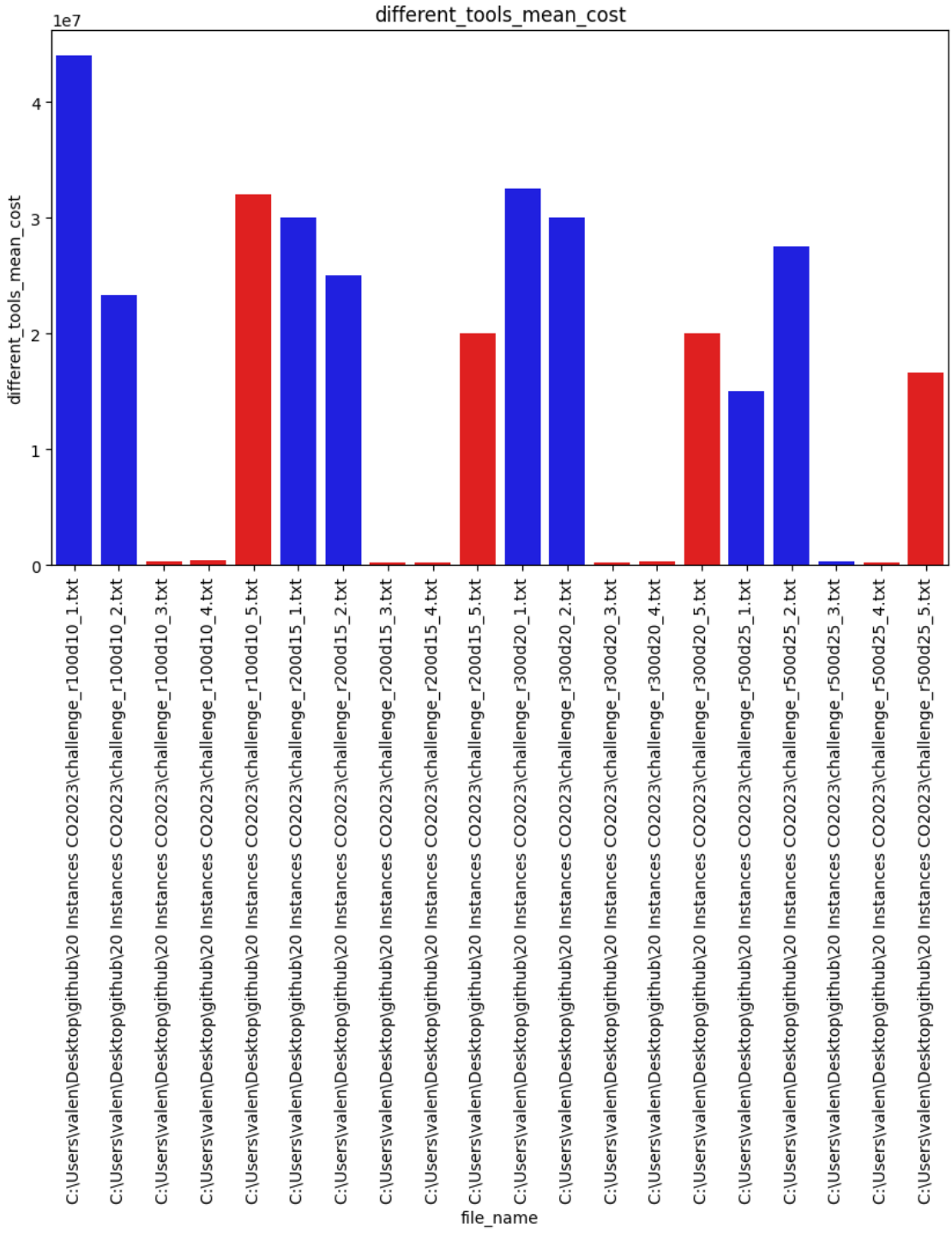
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r500d25_5.txt


different_tools_mean_cost
1e7
different_tools_mean_cost
0
1
2
3
4
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_3.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_4.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r100d10_5.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_1.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_2.txt
C:\Users\valen\Desktop\github\20 Instances CO2023\challenge_r200d15_3.txt
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