Tugas 2 Teknologi Basis Data
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Query :

- SELECT * FROM student
- SELECT * FROM student WHERE tot_cred > 30;
- SELECT `name`, dept_name FROM student WHERE tot_cred > 30;
- SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id
- SELECT student.`name`,student.dept_name,takes.sec_id AS pengambilan,takes.semester,section.room_number,section.building,course.course_id,course.dept_n ame FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN course ON section.course_id = course.course_id

Langkah Awal : Generate dataset

```
results = []
for i, query in enumerate(queries):
    for j, data_size in enumerate(data_sizes):
        # Generate data
        student_data = generate_data(data_size['student'])
        student_df = pd.DataFrame(student_data, columns=['ID', 'name', 'dept_name', 'tot_cred'])

        takes_df = pd.DataFrame(generate_data(data_size['takes']), columns=['ID', 'course_id', 'sec_id', 'semester'])

        section_df = pd.DataFrame(generate_data(data_size['section']), columns=['course_id', 'sec_id', 'semester', 'year'])

        course_df = pd.DataFrame(generate_data(data_size['section']), columns=['course_id', 'title', 'dept_name', 'credits'])

        # Measure time
        start_time = time.time()
        result_df = eval(query)
        end_time = time.time()

        # Save result
        results.append({
            'query': f"Query {i+1}",
            'data_size': f"Data Size {j+1}",
            'time': end_time - start_time
        })
```

Hasil Dari Dataframe yang terbentuk akan di tes untuk sebelum tunning dan sesudah Tunning

Hasilnya :

Sebelum Tunning

Data	Waktu Sebelum Tunning (ms)				
	Query 1	Query 2	Query 3	Query 4	Query 5
advisor = 100, student = 100, section = 200,takes = 200	0.00053050	0.05206570	0.00032360	0.06588500	0.04301530
advisor = 200, student = 200, section = 400,takes = 400	0.00046220	0.00046140	0.00041780	0.00530660	0.00520800
advisor = 500, student = 500, section = 1000,takes = 1000	0.00116020	0.00223750	0.00111840	0.18902910	0.04922280
advisor = 700, student = 700, section = 20000,takes = 20000	0.150	0.678	0.004	0.652	8.134
advisor = 1000, student = 1000, section = 100000,takes = 1000000	0.35	1.678	0.010	1.452	8.134
advisor = 1800, student = 1800, section = 180000,takes = 1800000	2.625	10.746	0.08	9.164	50.638

Sesudah Tunning

Data	Waktu Sesudah Tuning INDEX (ms)				
	Query 1	Query 2	Query 3	Query 4	Query 5
advisor = 100, student = 100, section = 200,takes = 200	0.00039780	0.05099050	0.00064030	0.05080840	0.04353880
advisor = 200, student = 200, section = 400,takes = 400	0.00053190	0.00049950	0.00037610	0.00769680	0.00508950
advisor = 500, student = 500, section = 1000,takes = 1000	0.00484500	0.00225590	0.00050110	0.02184320	0.21341150
advisor = 700, student = 700, section = 20000,takes = 20000	0.042	0.12	0.002	0.26	0.014
advisor = 1000, student = 1000, section = 100000,takes = 1000000	0.080	0.36	0.006	0.78	0.017
advisor = 1800, student = 1800, section = 180000,takes = 1800000	0.64	2.88	0.048	5.24	0.136