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PS D:\MSCS\CS500\HW4> & C:/Users/odody/AppData/Local/Programs/Python/Python311/python.exe  
d:/MSCS/CS500/HW4/expense_tracker.app.py
```

=====Expense Tracker=====

There are a few things to notice:

Firstly, when you enter a month, please use the first day of the month. For example, enter 2022-01-01 for Jan 2022.

Secondly, by default, the current month is September 2022 and budgets and expenses are only available between Jan 2022 and September 2022.

Thirdly, enter a float for percentage. For example, enter 0.1 for 10%

Lastly, the choice must be an integer.

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
11. Create monthly summary report
12. Create monthly expense for a specified category
13. Display highest expense employee for a certain month
14. Display department over budget limit for a certain month
15. Display highest expense department for a certain month
16. Alerts to department close to exceeding budget limit
17. Create total counts of expense category histogram for a specified department and for a certain month
18. Create department total monthly expense histogram for a certain month

19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 1

Input employee ID: 22

Input first name: Allison

Input last name: Ding

Input department name: Marketing

Input rank: Senior Manager

The employee is successfully added!

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
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14. Display department over budget limit for a certain month
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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 3

Input employee ID: 22

employee_id = 22, first_name = Allison, last_name = Ding, department_name = Marketing, rank = Senior Manager

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report

11. Create monthly summary report
12. Create monthly expense for a specified category
13. Display highest expense employee for a certain month
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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 2

Input employee ID: 22

Input new first name: Alice

Input new last name: Deng

Input new department name: Sales

Input rank: Non-Exempt

The employee is successfully modified!

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee

5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
11. Create monthly summary report
12. Create monthly expense for a specified category
13. Display highest expense employee for a certain month
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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 3

Input employee ID: 22

employee_id = 22, first_name = Alice, last_name = Deng, department_name = Sales, rank = Non-Exempt

Menu

1. Add an employee
2. Modify an employee

3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 4

Input employee ID: 22

The employee is successfully removed!

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
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12. Create monthly expense for a specified category
13. Display highest expense employee for a certain month
14. Display department over budget limit for a certain month
15. Display highest expense department for a certain month
16. Alerts to department close to exceeding budget limit
17. Create total counts of expense category histogram for a specified department and for a certain month
18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 5

Input department name: Sanctions

The department is successfully added!

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
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8. Remove a department
9. Input an expense
10. Create monthly expense report
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15. Display highest expense department for a certain month
16. Alerts to department close to exceeding budget limit
17. Create total counts of expense category histogram for a specified department and for a certain month
18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 1

Input employee ID: 22

Input first name: Allison

Input last name: Ding

Input department name: Sanctions

Input rank: Senior Staff

The employee is successfully added!

Menu

1. Add an employee
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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category

21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 1

Input employee ID: 33

Input first name: Alice

Input last name: Deng

Input department name: Sanctions

Input rank: Manager

The employee is successfully added!

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
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15. Display highest expense department for a certain month

16. Alerts to department close to exceeding budget limit
17. Create total counts of expense category histogram for a specified department and for a certain month
18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 7

Input department name: Sanctions

name = Sanctions, department_budgets = {}, employees = [employee_id = 22, first_name = Allison, last_name = Ding, department_name = Sanctions, rank = Senior Staff, employee_id = 33, first_name = Alice, last_name = Deng, department_name = Sanctions, rank = Manager]

Menu

1. Add an employee
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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 6

Input the current department name: Sanctions

Input the new department name: Financial Crime

The department is successfully modified!

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
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9. Input an expense

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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 7

Input department name: Sanctions

The department does not exist!

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department

8. Remove a department
9. Input an expense
10. Create monthly expense report
11. Create monthly summary report
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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 7

Input department name: Financial Crime

name = Financial Crime, department_budgets = {}, employees = [employee_id = 22, first_name = Allison, last_name = Ding, department_name = Sanctions, rank = Senior Staff, employee_id = 33, first_name = Alice, last_name = Deng, department_name = Sanctions, rank = Manager]

Menu

1. Add an employee
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4. Remove an employee

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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 8

Input department name: Financial Crime

The department is successfully removed!

Menu

1. Add an employee
2. Modify an employee

3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 7

Input department name: Financial Crime

The department does not exist!

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 9

Input date of expense: 2022-01-01

Input expense amount: 350

Input expense category: Equipment

Input employee ID: 1

The expense is successfully added!

Menu

1. Add an employee
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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID

24. Exit

Please enter your choice: 12

Input expense category: Equipment

department = Engineering, month = 2022-01-01, total_expense = 480.0

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
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7. Find a department
8. Remove a department
9. Input an expense
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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category

- 22. Display percentage used for each expense category (for all departments) for a certain month
- 23. Display employee expense by their ID
- 24. Exit

Please enter your choice: 11

Input month: 2022-01-01

department = Engineering, expense_category = Equipment, total_expense = 480.0

Menu

- 1. Add an employee
- 2. Modify an employee
- 3. Find an employee
- 4. Remove an employee
- 5. Add a department
- 6. Modify a department
- 7. Find a department
- 8. Remove a department
- 9. Input an expense
- 10. Create monthly expense report
- 11. Create monthly summary report
- 12. Create monthly expense for a specified category
- 13. Display highest expense employee for a certain month
- 14. Display department over budget limit for a certain month
- 15. Display highest expense department for a certain month
- 16. Alerts to department close to exceeding budget limit
- 17. Create total counts of expense category histogram for a specified department and for a certain month
- 18. Create department total monthly expense histogram for a certain month
- 19. Create employee total monthly expense histogram for a certain month

20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 10

Input department name: Engineering

Input month: 2022-01-01

first_name = Tracy, last_name = Jones, total_expense = 480.0

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
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17. Create total counts of expense category histogram for a specified department and for a certain month
18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 13

Input month: 2022-08-01

employee_id = 12, first_name = Raghu, last_name = Krishnan, department_name = Production, rank = Senior Staff, total_expense = 35000.0

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
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16. Alerts to department close to exceeding budget limit
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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 14

Input month: 2022-08-01

deparment = Sales, budget = 8000.0, total_expense = 22000.0

deparment = Production, budget = 12000.0, total_expense = 35000.0

deparment = Accounting, budget = 7000.0, total_expense = 22000.0

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
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6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense

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18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 15

Input month: 2022-08-01

department = Production, total_expense = 35000.0

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
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6. Modify a department
7. Find a department

8. Remove a department
9. Input an expense
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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 16

Production department has a total expense of 15000.0, close to its budget 16000.0!

Menu

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8. Remove a department
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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 17

Input department name: Production

Input month: 2022-08-01

1

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Materials

Menu

1. Add an employee

2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 17

Input department name: Accounting

Input month: 2022-08-01

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Overtime Pay

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
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7. Find a department
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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 17

Input department name: Engineering

Input month: 2022-01-01

2

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Equipment

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
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18. Create department total monthly expense histogram for a certain month

19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 18

Input month: 2022-08-01

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Sales	Production	Accounting

Menu

1. Add an employee
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16. Alerts to department close to exceeding budget limit
17. Create total counts of expense category histogram for a specified department and for a certain month
18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 19

Input month: 2022-08-01

20000	2000	35000	22000
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Sandeep Gelada	Selvin Silva	Raghu Krishnan	Jeff Cahill

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department

7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
11. Create monthly summary report
12. Create monthly expense for a specified category
13. Display highest expense employee for a certain month
14. Display department over budget limit for a certain month
15. Display highest expense department for a certain month
16. Alerts to department close to exceeding budget limit
17. Create total counts of expense category histogram for a specified department and for a certain month
18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 20

Input expense category: Transportation

Input percentage you want to lower: 0.1

The budget is successfully modified!

Menu

1. Add an employee
2. Modify an employee
3. Find an employee

4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
11. Create monthly summary report
12. Create monthly expense for a specified category
13. Display highest expense employee for a certain month
14. Display department over budget limit for a certain month
15. Display highest expense department for a certain month
16. Alerts to department close to exceeding budget limit
17. Create total counts of expense category histogram for a specified department and for a certain month
18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 21

Input percentage you want to lower: 0.1

The budget is successfully modified!

Menu

1. Add an employee

2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
11. Create monthly summary report
12. Create monthly expense for a specified category
13. Display highest expense employee for a certain month
14. Display department over budget limit for a certain month
15. Display highest expense department for a certain month
16. Alerts to department close to exceeding budget limit
17. Create total counts of expense category histogram for a specified department and for a certain month
18. Create department total monthly expense histogram for a certain month
19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 22

Input month: 2022-08-01

department = Sales, expense_category = Entertainment, budget = 2000.0, total_expense = 20000.0,
percentage_of_budget_used = 1000.00%

department = Sales, expense_category = Travel Insurance, budget = 5000.0, total_expense = 2000.0,
percentage_of_budget_used = 40.00%

department = Production, expense_category = Materials, budget = 7000.0, total_expense = 35000.0,
percentage_of_budget_used = 500.00%

department = Accounting, expense_category = Overtime Pay, budget = 4000.0, total_expense = 22000.0,
percentage_of_budget_used = 550.00%

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
11. Create monthly summary report
12. Create monthly expense for a specified category
13. Display highest expense employee for a certain month
14. Display department over budget limit for a certain month
15. Display highest expense department for a certain month
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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category

22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 23

date_of_expense = 2022-01-01, expense_amount = 130.0, expense_category = Equipment, employee_id = 1

date_of_expense = 2022-04-01, expense_amount = 20.0, expense_category = Magazine, employee_id = 1

date_of_expense = 2022-01-01, expense_amount = 350.0, expense_category = Equipment, employee_id = 1

date_of_expense = 2022-02-01, expense_amount = 450.0, expense_category = Training, employee_id = 2

date_of_expense = 2022-05-01, expense_amount = 5000.0, expense_category = Lab Expense, employee_id = 2

date_of_expense = 2022-03-01, expense_amount = 500.0, expense_category = Membership Fees, employee_id = 3

date_of_expense = 2022-02-01, expense_amount = 10000.0, expense_category = Advertisement, employee_id = 4

date_of_expense = 2022-03-01, expense_amount = 35000.0, expense_category = Promotion, employee_id = 5

date_of_expense = 2022-04-01, expense_amount = 25000.0, expense_category = Brand Ambassador, employee_id = 6

date_of_expense = 2022-05-01, expense_amount = 35000.0, expense_category = Transportation, employee_id = 7

date_of_expense = 2022-06-01, expense_amount = 15000.0, expense_category = Entertainment, employee_id = 8

date_of_expense = 2022-08-01, expense_amount = 20000.0, expense_category = Entertainment, employee_id = 9

date_of_expense = 2022-08-01, expense_amount = 2000.0, expense_category = Travel Insurance, employee_id = 10

date_of_expense = 2022-07-01, expense_amount = 40000.0, expense_category = Materials, employee_id = 11

Menu

1. Add an employee
2. Modify an employee
3. Find an employee
4. Remove an employee
5. Add a department
6. Modify a department
7. Find a department
8. Remove a department
9. Input an expense
10. Create monthly expense report
11. Create monthly summary report
12. Create monthly expense for a specified category
13. Display highest expense employee for a certain month
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19. Create employee total monthly expense histogram for a certain month
20. Modify budget for one category
21. Modify budget for all category
22. Display percentage used for each expense category (for all departments) for a certain month
23. Display employee expense by their ID
24. Exit

Please enter your choice: 24

PS D:\MSCS\CS500\HW4>