

SOAL PEMAHAMAN PYTHON

PERTEMUAN 1 - ALGORITMA DAN STRUKTUR DATA

Anda diberikan sebuah data seperti berikut:

```
[{"id": 1, "name": "John Doe", "contacts": {"email": "john.doe@example.com", "phone": "[+1234567890]", "address": {"home": {"street": "123 Main St", "city": "New York", "zip": "10001", "work": {"street": "456 Corporate Blvd", "city": "New York", "zip": "10002"}}, "projects": [{"project id": "P001", "title": "AI Research", "tasks": [{"task id": "T001", "description": "Data collection", "status": "completed"}, {"task id": "T002", "description": "Model training", "status": "in-progress"}]}], {"id": 2, "name": "Jane Smith", "contacts": {"email": "jane.smith@example.com", "phone": "[+1987654321]", "address": {"home": {"street": "789 Sunset Blvd", "city": "Los Angeles", "zip": "90001", "projects": [{"project id": "P002", "title": "Web Development", "tasks": [{"task id": "T003", "description": "UI design", "status": "not started"}, {"task id": "T004", "description": "Backend integration", "status": "in-progress"}]}], {"id": 3, "name": "Michael Brown", "contacts": {"email": "michael.brown@example.com", "phone": "", "address": {"home": {"street": "321 Ocean Drive", "city": "Miami", "zip": "33101", "projects": []}}, {"id": 4, "name": "Emily Davis", "contacts": {"email": "emily.davis@example.com", "phone": "[+1231231234]", "address": {"home": {"street": "444 Elm St", "city": "Chicago", "zip": "60601", "vacation": {"street": "555 Pine St", "city": "Orlando", "zip": "32801", "projects": [{"project id": "P003", "title": "Marketing Campaign", "tasks": [{"task id": "T005", "description": "Content creation", "status": "completed"}, {"task id": "T006", "description": "Social media promotion", "status": "in-progress"}]}], {"id": 5, "name": "David Wilson", "contacts": {"email": "david.wilson@example.com", "phone": "[+9999999999]", "address": {"home": {"street": "987 Birch Lane", "city": "Seattle", "zip": "98101", "projects": [{"project id": "P004", "title": "Blockchain Development", "tasks": [{"task id": "T007", "description": "Smart contract design", "status": "in-progress"}]}], {"id": 6, "name": "Sophia Martinez", "contacts": {"email": "sophia.martinez@example.com", "phone": "[+8888888888]", "address": {"home": {"street": "678 Maple Ave", "city": "Austin", "zip": "73301", "projects": [{"project id": "P005", "title": "Mobile App Development", "tasks": [{"task id": "T009", "description": "UI/UX Design", "status": "in-progress"}, {"task id": "T010", "description": "API Integration", "status": "not started"}]}], {"id": 7, "name": "Chris Johnson", "contacts": {"email": "chris.johnson@example.com", "phone": "[+6666666666]", "address": {"home": {"street": "432 Spruce Rd", "city": "Denver", "zip": "80201", "work": {"street": "123 Innovation Way", "city": "Denver", "zip": "80202", "projects": [{"project id": "P006", "title": "Cybersecurity Initiative", "tasks": [{"task id": "T011", "description": "Risk Assessment", "status": "completed"}, {"task id": "T012", "description": "Mitigation Planning", "status": "in-progress"}]}], {"id": 8, "name": "Olivia Taylor", "contacts": {"email": "olivia.taylor@example.com", "phone": "[+5555555555]", "address": {"home": {"street": "345 Ash St", "city": "San Francisco", "zip": "94101", "projects": [{"project id": "P007", "title": "Data Science Analysis", "tasks": [{"task id": "T013", "description": "Data Cleaning", "status": "completed"}, {"task id": "T014", "description": "Model Evaluation", "status": "in-progress"}]}], {"id": 9, "name": "William Anderson", "contacts": {"email": "william.anderson@example.com", "phone": "[+4444444444]", "address": {"home": {"street": "555 Oak Lane", "city": "Boston", "zip": "02101", "projects": []}}, {"id": 10, "name": "Amelia Thomas", "contacts": {"email": "amelia.thomas@example.com", "phone": "[+3333333333]", "address": {"home": {"street": "876 Willow St", "city": "Portland", "zip": "97201", "office": {"street": "123 Greenway Blvd", "city": "Portland", "zip": "97202", "projects": [{"project id": "P008", "title": "Cloud Infrastructure Setup", "tasks": [{"task id": "T015", "description": "Server Provisioning", "status": "completed"}, {"task id": "T016", "description": "Load Balancer Configuration", "status": "in-progress"}]}]}}
```

Deskripsi Data

Data di atas adalah sebuah list of dict yang berisi informasi tentang individu dan proyek-proyek mereka. Setiap entri dalam list memiliki struktur sebagai berikut:

- **ID:** Angka unik untuk mengidentifikasi setiap individu.
- **Name:** Nama individu.
- **Projects:** List proyek yang dikerjakan individu, dengan rincian:
- **Project ID:** ID unik untuk proyek.
- **Title:** Judul proyek.
- **Tasks:** List tugas dalam proyek, dengan setiap tugas memiliki.
- **Task ID:** ID unik untuk tugas.
- **Description:** Deskripsi tugas.
- **Status:** Status tugas (completed, in-progress, atau not started).
- **Contacts:** Informasi kontak yang berisi:
- **Email:** Alamat email individu.
- **Phone:** List nomor telepon individu.

- **Address:** Dictionary dengan alamat-alamat seperti home, work, atau vacation, yang mencakup street, city, dan zip.

Berdasarkan data tersebut anda perlu mengerjakan 2 soal dibawah ini:

Soal 1

Identifikasi Individu dengan Semua Proyek Selesai

Buat fungsi bernama `find_individuals_with_all_completed_projects` yang mengembalikan list nama individu yang semua proyeknya sudah selesai. Proyek dianggap selesai jika semua tugas di dalamnya memiliki status "completed".

Contoh Output:

```
['John Doe', 'Emily Davis']
```

Soal 2

Gabungkan Tugas Berdasarkan Kota

Buat fungsi bernama `combine_tasks_by_city` yang mengelompokkan semua tugas berdasarkan kota dari alamat home individu. Setiap tugas harus menyertakan nama individu, ID proyek, dan ID tugas. Hasilnya berupa dictionary dengan nama kota sebagai kunci dan list tugas sebagai nilai.

Contoh Output:

```
{ "New York": [ {"name": "John Doe" , }, {"name": "John Doe" , }, ], "Los Angeles": [ {"name": "Jane Smith" , {"name": "Jane Smith" , "project_id": "P001" , "project_id": "P001" , "task_id": "T001"}, {"task_id": "T002"} "project_id": "P002" , "project_id": "P002" , "task_id": "T003"}, {"task_id": "T004"} ], ... }
```

Soal 3

Identifikasi Individu dengan Proyek Terbanyak

Buatlah fungsi bernama `find_individual_with_most_projects` yang mengembalikan sebuah dictionary berisi individu dengan jumlah proyek terbanyak beserta frekuensinya.

- Fungsi harus menelusuri daftar individu dan menghitung jumlah proyek yang dimiliki oleh masing-masing individu.
- Jika ada lebih dari satu individu yang memiliki jumlah proyek terbanyak yang sama, semua individu tersebut harus dimasukkan ke dalam dictionary hasil.
- Output berupa dictionary dengan **nama individu sebagai kunci** dan **jumlah proyek sebagai nilai**.

Contoh Output:

```
{ "Sophia Martinez": 4, "Emily Davis": 4 }
```

Instruksi:

1. Anda wajib mengerjakan soal di atas menggunakan google colab.
2. Anda wajib mengumpulkan jawaban maksimal tanggal 7 Maret 2025 pukul 07:30 WIB ke email irvanseptiar@gmail.com dengan subject T1_ALSTRUKDAT_KELAS_NIM_NAMA.
3. Body email berisikan link google colab kalian. Pastikan link yang diberikan dapat diakses oleh email irvanseptiar@gmail.com sebagai editor.
4. Anda wajib mengerti dan memahami setiap baris code yang anda kumpulkan.
5. Setiap keterlambatan dianggap tidak mengerjakan tugas.