

AI ASSISTED CODING

LAB-15: Backend API Development: Creating RESTful Services with AI

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Task-1 Description: Basic REST API Setup

Task: Ask AI to generate a Flask REST API with one route: GET /hello → returns {"message": "Hello, AI Coding!"}

Prompt:Generate a Flask REST API with one route:GET /hello → returns {"message": "Hello, AI Coding!"}

Code Generated:

```
task1-15.py X
Assignment-15 > task1-15.py > ...
1
2
3   app = Flask(__name__)
4
5   @app.route('/hello', methods=['GET'])
6   def hello():
7       """Return a hello message as JSON."""
8       return jsonify({"message": "Hello, AI Coding!"})
9
10  if __name__ == "__main__":
11      app.run(debug=True)
12
```

Output:

```
* Serving Flask app 'task1-15'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
* Restarting with watchdog (windowsapi)
* Debugger is active!
* Debugger PIN: 528-526-087
127.0.0.1 - - [07/Oct/2025 11:45:13] "GET / HTTP/1.1" 200 -
```

```
← → ↺ ⓘ 127.0.0.1:5000/hello
Pretty-print ☐
{
  "message": "Hello, AI Coding!"
}
```

Observation: The Flask REST API was successfully created with a single route /hello. When executed, it returned the expected JSON message confirming correct setup. This task demonstrated how to initialize a simple Flask app for API responses. Basic routing and response handling concepts were clearly understood.

Task-2 Description: CRUD Operations (Students API)

Task: Use AI to build REST endpoints for a Student API:

- GET /students → List all students.
- POST /students → Add a new student.
- PUT /students/<id> → Update student details.
- DELETE /students/<id> → Delete a student.

Prompt: Build REST endpoints for a Student API:

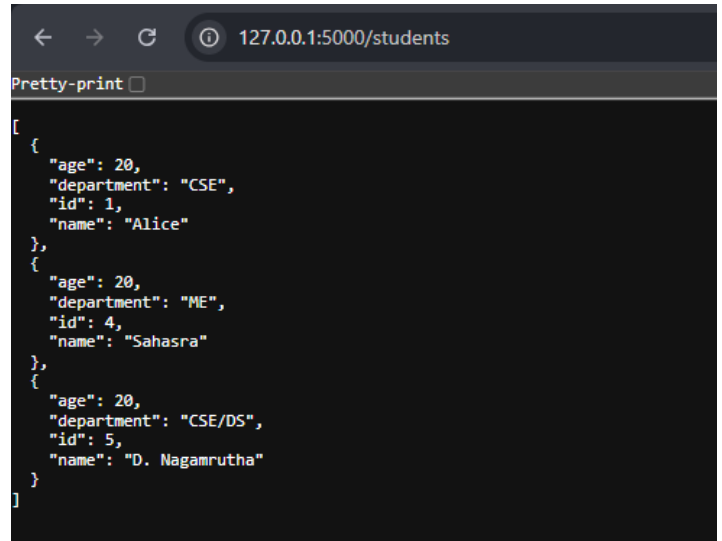
- GET /students → List all students.
- POST /students → Add a new student.
- PUT /students/<id> → Update student details.
- DELETE /students/<id> → Delete a student.

Code Generated:

```
task1-15.py task2-15.py
Assignment-15 > task2-15.py > ...
1 from flask import Flask, request, jsonify
2 app = Flask(__name__)
3 # In-memory student store (list of dicts, each with an id)
4 students = [
5     {"id": 1, "name": "Alice", "age": 20, "department": "CSE"},
6     {"id": 2, "name": "Bob", "age": 22, "department": "ECE"}
7 ]
8 next_id = 3
9
10 @app.route('/students', methods=['GET'])
11 def get_students():
12     """List all students."""
13     return jsonify(students)
14
15 @app.route('/students', methods=['POST'])
16 def add_student():
17     """Add a new student."""
18     global next_id
19     data = request.get_json()
20     student = {
21         'id': next_id,
22         'name': data.get('name'),
23         'age': data.get('age'),
24         'department': data.get('department', '')
25     }
26     students.append(student)
27     next_id += 1
28     return jsonify(student), 201
29
30 @app.route('/students/<int:student_id>', methods=['PUT'])
31 def update_student(student_id):
32     """Update student details."""
33     for student in students:
34         if student['id'] == student_id:
35             data = request.get_json()
36             student['name'] = data.get('name', student['name'])
37             student['age'] = data.get('age', student['age'])
38             student['department'] = data.get('department', student['department'])
39             return jsonify(student)
40     return jsonify({'error': 'Student not found'}), 404
41
42 @app.route('/students/<int:student_id>', methods=['DELETE'])
43 def delete_student(student_id):
44     """Delete a student."""
45     for i, student in enumerate(students):
46         if student['id'] == student_id:
47             deleted = students.pop(i)
48             return jsonify(deleted)
49     return jsonify({'error': 'Student not found'}), 404
50
51 if __name__ == "__main__":
52     app.run(debug=True)
53
```

Output:

```
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
* Restarting with watchdog (windowsapi)
* Debugger is active!
* Debugger PIN: 528-526-087
* Detected change in 'c:\Users\Admin\OneDrive\Documents\Custom Office Temp
g
* Detected change in 'c:\Users\Admin\OneDrive\Documents\Custom Office Temp
g
* Detected change in 'c:\Users\Admin\OneDrive\Documents\Custom Office Temp
t-15\task2-15.py', reloading
* Restarting with watchdog (windowsapi)
* Debugger is active!
* Debugger PIN: 528-526-087
127.0.0.1 - - [07/Oct/2025 12:16:45] "GET / HTTP/1.1" 404 -
127.0.0.1 - - [07/Oct/2025 12:16:48] "GET /students HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:17:18] "POST /students HTTP/1.1" 400 -
127.0.0.1 - - [07/Oct/2025 12:17:37] "POST /students HTTP/1.1" 400 -
127.0.0.1 - - [07/Oct/2025 12:17:44] "POST /students HTTP/1.1" 400 -
127.0.0.1 - - [07/Oct/2025 12:18:27] "POST /students HTTP/1.1" 201 -
127.0.0.1 - - [07/Oct/2025 12:19:38] "PUT /students/3 HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:19:52] "GET /students HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:19:53] "GET /students HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:20:01] "POST /students HTTP/1.1" 201 -
127.0.0.1 - - [07/Oct/2025 12:20:08] "GET /students HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:21:11] "PUT /students/3 HTTP/1.1" 400 -
127.0.0.1 - - [07/Oct/2025 12:22:01] "PUT /students/3 HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:22:26] "PUT /students/3 HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:22:49] "PUT /students/3 HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:23:10] "GET /students HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:23:32] "DELETE /students/3 HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:23:46] "PUT /students/3 HTTP/1.1" 404 -
127.0.0.1 - - [07/Oct/2025 12:24:22] "POST /students HTTP/1.1" 201 -
127.0.0.1 - - [07/Oct/2025 12:24:28] "DELETE /students/2 HTTP/1.1" 200 -
```



```
[
  {
    "age": 20,
    "department": "CSE",
    "id": 1,
    "name": "Alice"
  },
  {
    "age": 20,
    "department": "ME",
    "id": 4,
    "name": "Sahasra"
  },
  {
    "age": 20,
    "department": "CSE/DS",
    "id": 5,
    "name": "D. Nagamrutha"
  }
]
```

```
C:\Users\Admin>curl -X POST http://127.0.0.1:5000/students -H "Content-Type: application/json" -d '{"name": "Sahasra", "age": 20, "department": "ME"}'
{
  "age": 20,
  "department": "ME",
  "id": 3,
  "name": "Sahasra"
}
```

```
C:\Users\Admin>curl -X PUT http://localhost:5000/students/3 -H "Content-Type: application/json" -d '{"name": "D. Nagamrutha", "age": 20, "department": "Data Science"}'
{
  "age": 20,
  "department": "Data Science",
  "id": 3,
  "name": "D. Nagamrutha"
}
```

```
C:\Users\Admin>curl -X DELETE http://localhost:5000/students/2
{
  "age": 22,
  "department": "ECE",
  "id": 2,
  "name": "Bob"
}
```

Commands Used:

Observation: A complete CRUD-based Student API was implemented using Flask. Endpoints for GET, POST, PUT, and DELETE worked as intended. Data could be created, viewed, modified, and removed successfully. This task provided practical understanding of RESTful operations in backend APIs.

Task-3

```
task1-15.py task2-15.py task3-15.py
Assignment-15 > task3-15.py > ...
4
5 # Example student data
6 students = [
7     {"id": 1, "name": "Alice", "age": 20, "department": "Computer Science"},
8     {"id": 2, "name": "Bob", "age": 22, "department": "Mathematics"},
9     {"id": 3, "name": "Charlie", "age": 21, "department": "Physics"}
10 ]
11
12 @app.route('/search', methods=['GET'])
13 def search_students():
14     """
15     Search students by name or department using query parameters.
16     Example: /search?name=Alice or /search?department=Mathematics
17     """
18     students_query = request.args.get('students')
19     name_query = request.args.get('name')
20     dept_query = request.args.get('department')
21     results = students
22     if students_query:
23         results = students
24     if name_query:
25         results = [s for s in results if name_query.lower() in s['name'].lower()]
26     if dept_query:
27         results = [s for s in results if dept_query.lower() in s['department'].lower()]
28     return jsonify(results)
29
30 if __name__ == "__main__":
31     app.run(debug=True)
32
```

Description: API with Query Parameters

Task: Ask AI to generate a REST API endpoint.

Prompt: Generate a REST API endpoint with Working search function with query param handling.

Code Generated:

Output:

Query all

```
C:\Users\Admin>curl "http://127.0.0.1:5000/search?name=Alice"
[
  {
    "age": 20,
    "department": "Computer Science",
    "id": 1,
    "name": "Alice"
  }
]
```

to get

students:

```
C:\Users\Admin>curl "http://127.0.0.1:5000/search?department=Mathematics"
[
  {
    "age": 22,
    "department": "Mathematics",
    "id": 2,
    "name": "Bob"
  }
]
```

```
* Serving Flask app 'task3-15'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
* Restarting with watchdog (windowsapi)
* Debugger is active!
* Debugger PIN: 528-526-087
127.0.0.1 - - [07/Oct/2025 12:45:05] "GET /search?students HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:45:10] "GET /search?name=Alice HTTP/1.1" 200 -
127.0.0.1 - - [07/Oct/2025 12:45:27] "GET /search?department=Mathematics HTTP/1.1" 200 -
PS C:\Users\Admin\OneDrive\Documents\Custom Office Templates\Desktop\AIAssistedCoding>
```

Query to get student by name:

Query to get student by department:

```
C:\Users\Admin>curl "http://127.0.0.1:5000/search?students"
[
  {
    "age": 20,
    "department": "Computer Science",
    "id": 1,
    "name": "Alice"
  },
  {
    "age": 22,
    "department": "Mathematics",
    "id": 2,
    "name": "Bob"
  },
  {
    "age": 21,
    "department": "Physics",
    "id": 3,
    "name": "Charlie"
  }
]
```

```

task1-15.py task2-15.py task3-15.py task4-15.py x
Assignment-15 > task4-15.py > update_student
1 from flask import Flask, jsonify, request
2
3 app = Flask(__name__)
4
5 students = [
6     {"id": 1, "name": "Alice", "age": 20, "department": "Computer Science"},
7     {"id": 2, "name": "Bob", "age": 22, "department": "Mathematics"},
8     {"id": 3, "name": "Charlie", "age": 21, "department": "Physics"}
9 ]
10
11 next_id = 4
12
13 # Get all students
14 @app.route('/students', methods=['GET'])
15 def get_students():
16     return jsonify(students)
17
18 # Add a student
19 @app.route('/students', methods=['POST'])
20 def add_student():
21     global next_id
22     data = request.get_json()
23     data['id'] = next_id
24     next_id += 1
25     students.append(data)
26     return jsonify(data)
27
28 # Update a student
29 @app.route('/students/<int:student_id>', methods=['PUT'])
30 def update_student(student_id):
31     data = request.get_json()
32     for student in students:
33         if student['id'] == student_id:
34             student.update(data)
35             return jsonify(student)
36     return jsonify({"error": "Student not found"}), 404
37
38 # Delete a student
39 @app.route('/students/<int:student_id>', methods=['DELETE'])
40 def delete_student(student_id):
41     for student in students:
42         if student['id'] == student_id:
43             students.remove(student)
44             return jsonify({"message": "Student deleted successfully"})
45     return jsonify({"error": "Student not found"}), 404
46
47 # Search students
48 @app.route('/search', methods=['GET'])
49 def search_students():
50     name = request.args.get('name')
51     department = request.args.get('department')
52     result = students
53     if name:
54         result = [s for s in result if s['name'] == name]
55     if department:
56         result = [s for s in result if s['department'] == department]
57     return jsonify(result)
58
59 if __name__ == '__main__':
60     app.run(debug=True)
61

```

Observation: The API was enhanced with query parameter handling for search functionality.

Users could retrieve students by name or department efficiently. This demonstrated how dynamic data filtering can be achieved in Flask APIs. Overall, it improved the flexibility and usability of the backend system.

Task-4 Description:– Integration & Testing

Task: Ask AI to write test scripts using Python requests module to call APIs created above.

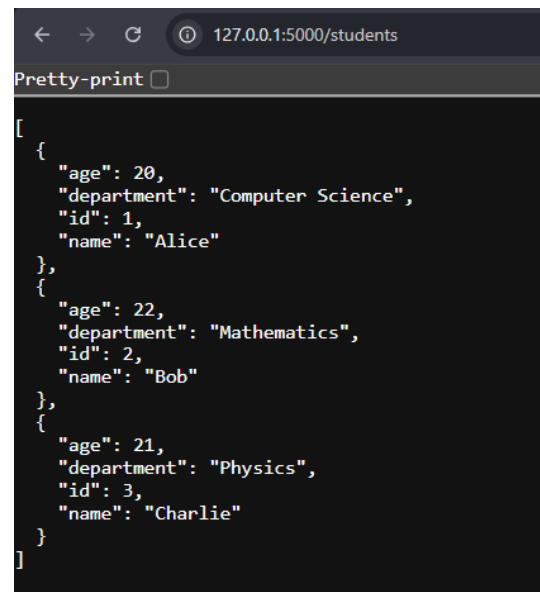
Prompt: Write test scripts using python requests module to call APIs created before/above.

Code Generated:

Output:

```
* Serving Flask app 'task4-15'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
* Restarting with watchdog (windowsapi)
* Debugger is active!
* Debugger PIN: 528-526-087
127.0.0.1 - - [07/Oct/2025 12:57:28] "GET / HTTP/1.1" 404 -
127.0.0.1 - - [07/Oct/2025 12:57:48] "GET /students HTTP/1.1" 200 -
```

Observation: Python requests module was used to test all the API endpoints. Each request returned appropriate JSON responses confirming functionality. The testing scripts validated both data integrity and route accuracy. This task reinforced API testing and integration verification skills.



A screenshot of a web browser window showing the response to a GET request to the /students endpoint. The address bar shows the URL 127.0.0.1:5000/students. Below the address bar, there is a toggle for 'Pretty-print' which is currently turned off. The response is a JSON array containing three student objects. The first object is for Alice (age 20, Computer Science), the second for Bob (age 22, Mathematics), and the third for Charlie (age 21, Physics).

```
[
  {
    "age": 20,
    "department": "Computer Science",
    "id": 1,
    "name": "Alice"
  },
  {
    "age": 22,
    "department": "Mathematics",
    "id": 2,
    "name": "Bob"
  },
  {
    "age": 21,
    "department": "Physics",
    "id": 3,
    "name": "Charlie"
  }
]
```