Syrian Arab Republic

Lattakia - Tishreen University

Department of Communication and electrical engineering

5th , Network Programming : Homework No2

الجمهورية العربية السورية

اللاذقية ـجامعــة تشريـــن

كلية الهندسة الكهربائية والميكانيكية

قسم هندسة الاتصالات والالكترونيات

السنة الخامسة: وظيفة2 برمجة شبكات

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Second Network Programming Homework

Question 1: TCP Server/Client Quiz App with Multi-threading?

As an improvement to previous first homework, build a TCP server and client quiz application using Python. The server should handle multiple client connections simultaneously using multi-threading. The application should allow clients to connect, participate in a quiz, and receive their quiz scores upon completion.

Requirements:

A. The server should be able to handle multiple client connections concurrently.
B. The quiz should consist of a set of pre-defined questions stored on the server.
C. Each client should connect to the server and receive the quiz questions.
D. Clients should send their answers to the server.
E. The server should keep track of the scores for each client.
F. At the end of the quiz, the server should send the final scores to each client.

Guidelines:

- Use Python's socket module “don’t use 3thd-party packages”.
- Implement multi-threading to handle multiple client connections concurrently.
- Store the quiz questions and correct answers on the server side.

Notes:

- Write brief report describing the design choices you made and any challenges faced during implementation.
- You can make a TCP Server/Client of your choice, such as Bank ATM, Chat application, or any other appropriate application that fulfil all requirements.

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```
import socket
import threading


questions ={
    'STP protocl mainmission is preventing later 3 loops .': 'f',
    'The device can send and receive at the same time when workin on Half-Duplex mode.': 'f',
    '6In STP, Blocking ports can still receive BBDUs.': 't',
    'VLANS help in reducing the size of broadcast domains.': 't',
    'Root switch has many Root ports .': 'f',
    'We can use only one router port to serve multiple VLANs .': 't',
    'ISL is a type of routing protocols.': 'f',
    'same switch may support multiple LAN technologies.': 't',
    'HTTP DNS FTP are Transport Layer protocols.': 'f',
    'SRES is an essential data of GSN SIM card.': 'f',
    'There is need to use any mobility managment between in progress calls inside the cell.': 'f',
    'Slow frequency hopper is a part of BSC block diagram.': 'f',
    'same switch may support multiple LAN technologies.': 't',
    'Any cellular operation starts using BCCH.': 'f',
    ' VLANS help in reducing the size of broadcast domains.': 't',
    ' Root switch has many Root ports .': 'f',
    ' We can use only one router port to serve multiple VLANs .': 't',
    ' UDP adds Sequence number to sending datagrams.': 'f',
    ' same switch may support multiple LAN technologies.': 't',
    'In GSM system, the access burst has the longest guard bits.': 't',
    'UDP adds Sequence number to sending datagrams.': 'f'
}
```

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```
scores = {}

def new_client(client_socket, address):
    for question in questions.keys():
        client_socket.send(question.encode())
        answer = client_socket.recv(1024).decode()

        if answer == questions[question]:
            scores[address] = scores.get(address, 0) + 1

    if address in scores:
        score_message = '{}/{}'.format(scores[address], len(questions))
        client_socket.send(score_message.encode())

    client_socket.close()

def start_server():
    server_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    server_socket.bind(('localhost', 4432))
    server_socket.listen(5)
    print('server started .')
    while True:
        client_socket, address = server_socket.accept()
        print('New client  :', address)

        client_thread = threading.Thread(target=new_client, args=(client_socket, address))
        client_thread.start()
start_server()
```

يتم استيراد مكتبات Socket و Threading.

يحتوي المتغير questions على مجموعة من الأسئلة والإجابات المقابلة لها في شكل قاموس.

المتغير scores يستخدم لتتبع نتائج العملاء وحصر النقاط التي يحصلون عليها.

تعريف الدالة new_client تقوم بالتواصل مع عميل معين. تقوم الدالة بإرسال الأسئلة إلى العميل واستقبال إجاباته، ثم تقوم بتحديد ما إذا كانت الإجابة صحيحة أم لا وتحسب النقاط .

في النهاية، تقوم الدالة بإرسال نتيجة العميل إليه.

دالة start_server تستخدم لبدء سيرفر الاستماع. تتم معالجة اتصال العميل الجديد عبر إنشاء خيط جديد يستدعي الدالة new_client لكل عميل جديد.

يتم ربط سيرفر Socket بعنوان 'IP 'localhost ومنفذ ٤٤٣٢.

عند تشغيل البرنامج، يتم طباعة رسالة "server started." للإشارة إلى بدء تشغيل السيرفر.

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عندما يتصل عميل جديد، يتم طباعة رسالة "New client:" مع عنوان العميل.

ثم يتم إنشاء خيط جديد للتعامل مع العميل ويتم تشغيل الخيط باستخدام الدالة new_client.

السيرفر يستمر في الاستماع للعملاء الجدد وتكرار نفس العملية لكل عميل جديد يتصل به.

```
File  Edit  Format  Run  Options  Window  Help
import socket

def start_client():
    server_address = ('localhost', 4432)
    client_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    client_socket.connect(server_address)

    for i in range (20):
        question = client_socket.recv(1024).decode()
        print("Question:", question)
        answer = input("Your answer (t or f): ")
        client_socket.sendall(answer.encode())

    final_score = client_socket.recv(1024).decode()
    print( 'Score:' ,final_score)


start_client()
```

يتم استيراد مكتبة Socket.

تعريف الدالة start_client يقوم بإنشاء عميل والاتصال بسيرفر Socket بعنوان 'IP 'localhost ومنفذ ٤٤٣٢.

ثم يتم استقبال الأسئلة من السيرفر وطباعتها للعميل. العميل يدخل إجابته على السؤال (صح أم خطأ) وترسل الإجابة إلى السيرفر.

تتكرر العملية لمجموعة من ٢٠ سؤال.

في النهاية، يتم استقبال النتيجة النهائية من السيرفر وطباعتها للعميل.

Name: , Number: , Submitted To GitHub:

```
Your answer (t or f): t
Question: same switch may support multiple LAN technologies.
Your answer (t or f): t
Question: HTTP DNS FTP are Transport Layer protocols.
Your answer (t or f): t
Question: SRES is an essential data of GSN SIM card.
Your answer (t or f): t
Question: There is need to use any mobility managment between in progress calls inside the cell.
Your answer (t or f): t
Question: Slow frequency hopper is a part of BSC block diagram.
Your answer (t or f): t
Question: Any cellular operation starts using BCCH.
Your answer (t or f): t
Question:  VLANS help in reducing the size of broadcast domains.
Your answer (t or f): t
Question:  Root switch has many Root ports .
Your answer (t or f): t
Question:  We can use only one router port to serve multiple VLANs .
Your answer (t or f): t
Question:  UDP adds Sequence number to sending datagrams.
Your answer (t or f): t
Question:  same switch may support multiple LAN technologies.
Your answer (t or f): t
Question: In GSM system, the access burst has the longest guard bits.
Your answer (t or f): t
Question: UDP adds Sequence number to sending datagrams.
Your answer (t or f): t
Score: 8/20
```

```
Your answer (t or f): f
Question: same switch may support multiple LAN technologies.
Your answer (t or f): f
Question: HTTP DNS FTP are Transport Layer protocols.
Your answer (t or f): f
Question: SRES is an essential data of GSN SIM card.
Your answer (t or f): f
Question: There is need to use any mobility managment between in progress calls inside the cell.
Your answer (t or f): f
Question: Slow frequency hopper is a part of BSC block diagram.
Your answer (t or f): f
Question: Any cellular operation starts using BCCH.
Your answer (t or f): f
Question:  VLANS help in reducing the size of broadcast domains.
Your answer (t or f): f
Question:  Root switch has many Root ports .
Your answer (t or f): f
Question:  We can use only one router port to serve multiple VLANs .
Your answer (t or f): f
Question:  UDP adds Sequence number to sending datagrams.
Your answer (t or f): f
Question:  same switch may support multiple LAN technologies.
Your answer (t or f): f
Question: In GSM system, the access burst has the longest guard bits.
Your answer (t or f): f
Question: UDP adds Sequence number to sending datagrams.
Your answer (t or f): f
Score: 12/20
```

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Question 2: Simple Website with Python Flask Framework

Create a simple website with multiple pages using Flask, HTML, CSS, and Bootstrap. The website should demonstrate your understanding of web design principles.

Requirements:

A. Set up a local web server using XAMPP, IIS, or Python's built-in server (using Flask).
B. Apply CSS and Bootstrap to style the website and make it visually appealing.
C. Ensure that the website is responsive and displays correctly on different screen sizes.
D. Implement basic server-side functionality using Flask to handle website features.

index.html

templates > index.html > html > body > section > ul

```
<!DOCTYPE html>
<html>
<head>
    <title>Math Learning</title>
    <link rel="stylesheet" href="{{ url_for('static', filename='css/bootstrap.min.css') }}">
    <link rel="stylesheet" href="{{ url_for('static', filename='css/style.css') }}">
</head>
<body>
    <header>
        <nav>
            <ul>
                <li><a href="{{ url_for('index') }}">Home</a></li>
                <li><a href="{{ url_for('about') }}">About</a></li>
                <li><a href="{{ url_for('contact') }}">Contact</a></li>
            </ul>
        </nav>
    </header>

    <section>
        <h1>Welcome to Math Learning!</h1>
        <p>Our website is dedicated to helping you learn mathematics. We offer a wide range of courses and resources to enhance your mathematical
    </section>

    <section>
        <h2>Levels</h2>
        <ul>
            <li>Beginner</li>
            <li>Intermediate</li>
            <li>Advanced</li>
        </ul>
    </section>

    <section>
        <h2>Certifications</h2>
        <ul>
            <li>Basic Mathematics Certificate</li>
            <li>Intermediate Mathematics Certificate</li>
            <li>Advanced Mathematics Certificate</li>
        </ul>
    </section>
</section>

    <footer>
        <p>&copy; 2023 Math Learning. All rights reserved.</p>
    </footer>
</body>
</html>
```

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about.html

templates > about.html > html > body > header

```
<!DOCTYPE html>
<html>
<head>
    <title>Math Learning</title>
    <link rel="stylesheet" href="{{ url_for('static', filename='css/bootstrap.min.css') }}">
    <link rel="stylesheet" href="{{ url_for('static', filename='css/style.css') }}">
</head>
<body>
    <header>
        <nav>
            <ul>
                <li><a href="{{ url_for('index') }}">Home</a></li>
                <li><a href="{{ url_for('about') }}">About</a></li>
                <li><a href="{{ url_for('contact') }}">Contact</a></li>
            </ul>
        </nav>
    </header>
    <section>
        <h1>About Us</h1>
        <p>Welcome to Math Learning, your ultimate destination for mastering mathematics. We are a dedicated team of passionate educators and expe
    </section>

    <section>
        <h2>Our Mission</h2>
        <p>Our mission is to make mathematics accessible and enjoyable for everyone. We strive to provide high-quality educational resources, enga
    </section>

    <section>
        <h2>Our Approach</h2>
        <p>At Math Learning, we believe in a hands-on and interactive approach to learning mathematics. We emphasize problem-solving, critical thi
    </section>

    <section>
        <h2>Meet Our Team</h2>
        <p>We are a diverse team of experienced educators, mathematicians, and technologists. Our team members bring a wealth of knowledge and exp
    </section>

    <footer>
        <p>&copy; 2023 Math Learning. All rights reserved.</p>
    </footer>
```

about.html | contact.html

templates > contact.html > html > body > section > ul > li

```
<!DOCTYPE html>
<html>
<head>
    <title>Capital Cities</title>
    <link rel="stylesheet" href="{{ url_for('static', filename='css/bootstrap.min.css') }}">
    <link rel="stylesheet" href="{{ url_for('static', filename='css/style.css') }}">
</head>
<body>
    <header>
        <nav>
            <ul>
                <li><a href="{{ url_for('index') }}">Home</a></li>
                <li><a href="{{ url_for('about') }}">About</a></li>
                <li><a href="{{ url_for('contact') }}">Contact</a></li>
            </ul>
        </nav>
    </header>
    <section>
        <h1>Contact Us</h1>
        <p>Got a question or feedback? We would love to hear from you! Get in touch with us using the contact details below:</p>
    </section>

    <section>
        <h2>Contact Information</h2>
        <ul>
            <li>Email: info@mathlearning.com</li>
        </ul>
    </section>

    <section>
        <h2>Send us a Message</h2>
        <form action="{{ url_for('index') }}" method="POST">
            <label for="name">Name:</label>
            <input type="text" id="name" name="name" required>

            <label for="email">Email:</label>
            <input type="email" id="email" name="email" required>
```

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```
            <label for="message">Message:</label>
            <textarea id="message" name="message" required></textarea>

            <input type="submit" value="Send Message">
        </form>
    </section>

    <footer>
        <p>&copy; 2023 Math Learning. All rights reserved.</p>
    </footer>
</body>
</html>
```

about.html | contact.html | app.py

app.py > ...

```
from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')
def index():
    return render_template('index.html')

@app.route('/about')
def about():
    return render_template('about.html')

@app.route('/contact')
def contact():
    return render_template('contact.html')

if __name__ == '__main__':
    app.run(debug=True , port=1337)

```

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```
from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')
def index():
    return render_template('index.html')

@app.route('/about')
def about():
    return render_template('about.html')

@app.route('/contact')
def contact():
    return render_template('contact.html')

if __name__ == '__main__':
    app.run(debug=True , port=1337)
```

نقوم بتشغيل الكود السابق بعد ذلك نضع في المتصفح العنوان التالي 127.0.0.1:1337

Syrian Arab Republic

Lattakia - Tishreen University

Department of Communication and electrical engineering

5th , Network Programming : Homework No2

الجمهورية العربية السورية

اللاذقية -جامعــة تشريـــن

كلية الهندسة الكهربائية والميكانيكية

قسم هندسة الاتصالات والالكترونيات

السنة الخامسة: وظيفة2 برمجة شبكات

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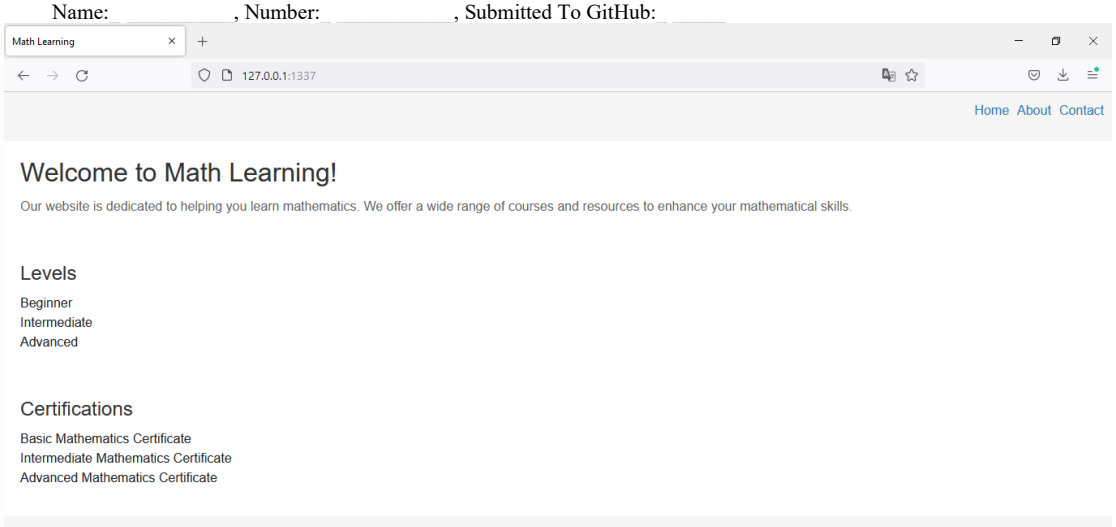

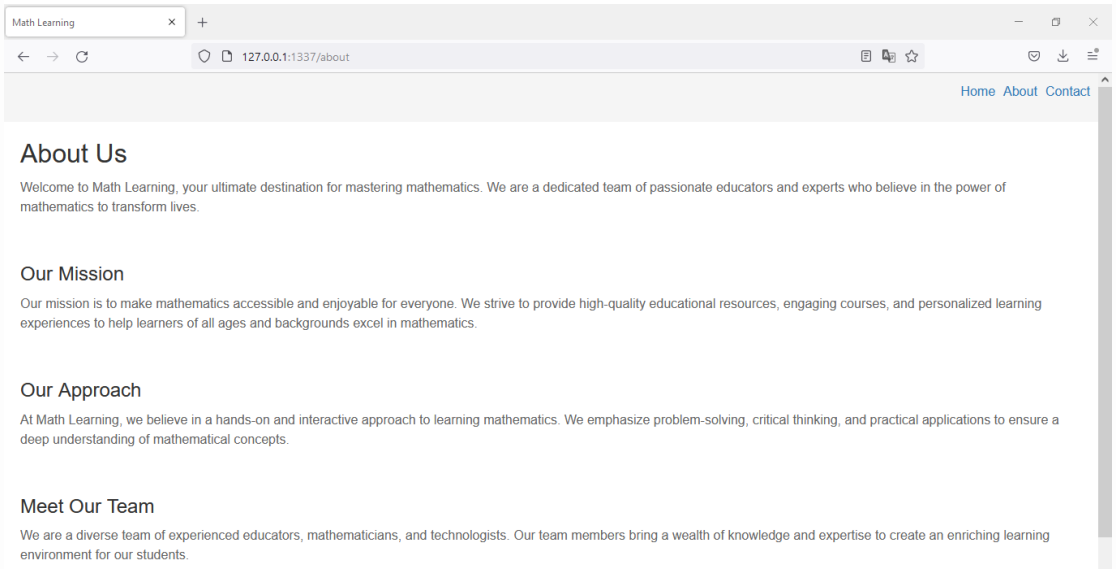

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