2025 CSSA, Fam_Q1, HTTP vs HTTPS

1 out of 1 · Exemplar · Feedback

Question 1

What is the difference between HTTP and HTTPS?

Student's answer

- A HTTPS uses encryption to secure data during transmission — correct
- B HTTP is used for mobile devices, while HTTPS is used for desktop — wrong
- C HTTP is faster than HTTPS — wrong
- D HTTPS can only be used with IPv6 — wrong

2025 CSSA, Fam_Q2, Robotic Process Automation

0 out of 1 · Exemplar · Feedback

Question 2

Enter the missing word:

_______________ Process Automation, automates repetitive tasks by mimicking human actions.

Student's answer

Correct answers:

Robotic

2025 CSSA, Fam_Q3, Machine Learning techniques

Exemplar · Feedback

Question 3

Which of the following machine learning techniques are appropriate for building a product recommendation system?

(Multiple items may be selected.)

Student's answer

- A Supervised learning with labelled purchase data — correct
- B Unsupervised learning for identifying customer segments — correct
- C Reinforcement learning for autonomous vehicle navigation — wrong
- D Collaborative filtering to suggest similar products — correct
- E Decision trees for binary classification of defective products — wrong

Clone - 2025 CSSA, Fam_Q4, Modelling Tools & their function

1 out of 3 · Exemplar · Feedback

Question 4

Match the following modelling tools with their function/pupose.

(Complete the table by selecting one correct radio button per row.)

Student's answer

	Data Flow Diagram	Structure Chart	Data Dictionary	Class Diagram	Storyboard	Decision Tree
represents a system by showing the separate subroutines that make up the system and their relationship to each other	●	○	○	○	○	○
provides a comprehensive description of each variable stored or referred to in a system	○	○	●	○	○	○
represents all possible combinations of decisions and their resulting actions	○	○	○	○	○	●
represents an overview of the entire system and do not show data stores or internal processes	○	○	○	○	○	○
shows the various interfaces (screens) as well as the links between them	○	○	○	●	○	○
a visual representation of systems that are implemented using the object-oriented paradigm	○	○	○	○	●	○

2025 CSSA, Fam_Q5, Programming the Web – HTTP request DFD

Exemplar Feedback

Question 5

Draw a Level 1 Data Flow Diagram (DFD) to represent the process of how an HTTP request works.

Student's answer

Full screen

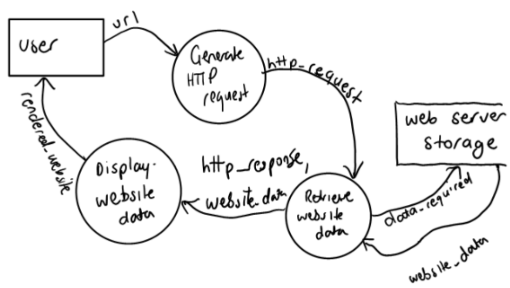
148%

Marking Criteria	Marks
Provides a substantially correct data flow diagram that includes suitable external entities, processes and data stores, with suitable data flow indicated	4
Provides a relevant data flow diagram that addresses several of the requirements	3
Provides a diagram with some correctly labelled data flow diagram symbols	2
Provides a diagram that shows some understanding of the scenario	1

Marking guidance

Sample Answer diagram will be professional re-drawn

Sample answer



2025 CSSA, Fam_Q6, Order data packet transmission process

Exemplar Feedback

Question 6

Arrange the following steps in the correct order to describe how data packets are transmitted over the internet using TCP/IP protocols from a source to a destination:

(Where top represents the source and bottom represents the destination.)

Student's answer

Answer not submitted

Marking criteria

Marking Criteria	Marks
Steps in correct order	2
It least 3 steps in correct order	1

2025 CSSA, Fam_Q7, Write OOP for a password strength checker

Exemplar Feedback

Question 7

Write a Python program that checks the strength of a password based on the stated criteria.

Student's answer

Run

Marking rubric

Knowledge of Python programming and the ability to apply logical conditions, loops, and string manipulation to assess password strength.

Ability to implement basic security criteria for password validation, including checks for length, uppercase, lowercase, numeric, and special characters.

Sample answer

Sample Solution 2 (without re module)

```python
# Function to check the strength of the password
def check_password_strength(password):
    """
    This function checks the strength of a password based on specific criteria:
    - At least 8 characters
    - Contains uppercase and lowercase letters
    - Contains at least one number
    - Contains at least one special character
    """
    # Define the set of allowed special characters
    special_characters = "!@#$%^&*(),.?\":{}|<>"

    # Check if the password has at least 8 characters
    if len(password) < 8:
        return "Weak"

    # Check if the password contains at least one uppercase letter
    if not any(char.isupper() for char in password):
        return "Weak"

    # Check if the password contains at least one lowercase letter
    if not any(char.islower() for char in password):
        return "Weak"

    # Check if the password contains at least one number
    if not any(char.isdigit() for char in password):
        return "Weak"

    # Check if the password contains at least one special character
    if not any(char in special_characters for char in password):
        return "Weak"

    # If all criteria are met, the password is strong
    return "Strong"

# Main program to get user input and evaluate password strength
if __name__ == "__main__":
    # Prompt the user to enter a password
    user_password = input("Enter a password to check its strength: ")

    # Call the function and store the result
    strength = check_password_strength(user_password)

    # Display the result to the user
    print(f"Your password is: {strength}")
```

Sample Solution 1

```python
import re
def check_password_strength(password):
    if len(password) < 8:
        return "Weak: Password should be at least 8 characters long."
    if not re.search(r"[A-Z]", password):
        return "Weak: Password should include at least one uppercase letter."
    if not re.search(r"[a-z]", password):
        return "Weak: Password should include at least one lowercase letter."
    if not re.search(r"[0-9]", password):
        return "Weak: Password should include at least one number."
    if not re.search(r"[!@#$%^&*(),.?\":{}|<>]", password):
        return "Weak: Password should include at least one special character."

    return "Strong password!"
password = input("Enter a password to check its strength: ")
print(check_password_strength(password))
```

2025 CSSA, Fam_Q8, Impact of AI

Exemplar Feedback

Question 8

Analyse the effects of Artifical Intelligence on the Environment.

Student's answer

Environmental Impacts of Artificial Intelligence: An Analytical Perspective

1. Introduction

Artificial Intelligence (AI) systems are becoming increasingly integral to modern life, driving innovation across industries. However, their expanding computational demands raise significant environmental concerns. This analysis evaluates both the direct and indirect environmental impacts of AI and explores pathways to mitigate these effects through sustainable practices, improved measurement, and informed policymaking.

2. Direct Environmental Impacts of AI Systems

Direct impacts arise from the lifecycle of AI infrastructure—from hardware production to system operation and disposal.

2.1 Production

- Manufacturing AI hardware involves mining and processing rare earth materials, resulting in **soil degradation, deforestation, and air and water pollution**.
- High-tech chip fabrication is resource-intensive, with a significant **carbon and material footprint**.

2.2 Transportation

- Although relatively minor, the transportation of hardware contributes **<5% of total GHG emissions** over an AI system's lifecycle.

2.3 Operational Energy Use

- AI workloads in data centers are a primary concern:
  - Global data centers consumed **200–250 TWh in 2020**, approximately **1% of global electricity demand**.
  - AI-specific workloads (e.g., model training) account for a growing portion of this usage, with companies like Google reporting **~15% of total energy use** on machine learning.
- As AI models grow (e.g., large language models), **compute requirements have increased by several orders of magnitude** (e.g., FLOPS increased by 300,000x since 2012).

2.4 Water Consumption

- AI operations also require substantial cooling, often involving water:
  - Data centers account for **<1% of U.S. water use**, yet this can have **localised impacts** on ecosystems, especially in arid regions.

3. Indirect Environmental Impacts of AI Applications

AI's environmental footprint extends beyond hardware, influencing various industries through its applications.

3.1 Negative Indirect Impacts

- AI can amplify environmental degradation when applied to **resource-intensive industries**:
  - Automation in **mining or manufacturing** may **increase energy and material consumption**.
  - Algorithmic inefficiencies and redundant AI applications can **worsen overall environmental performance**.

3.2 Positive Indirect Impacts

AI holds transformative potential for sustainability:

- **Energy**: Smart grids and demand-response systems.
- **Transport**: Optimised logistics and traffic reduction.
- **Agriculture**: Precision farming reduces pesticide and water use.

Estimates suggest AI could reduce **GHG emissions by 2.6–5.3 gigatons** by 2030, supporting the **UN Sustainable Development Goals (SDGs)**.

4. The Growth of AI Compute and Sustainability Challenges

The field has entered the **"Large-Scale Era"**, where training foundation models can consume **millions of kWh** per session. While **data center efficiency** has improved, these gains are outpaced by rising demand.

Challenges Identified:

- **Hardware improvements** (e.g., chip efficiency) are **not scaling fast enough** to offset growing compute requirements.
- **Lack of measurement standards** and **data transparency** impedes informed decision-making and accountability.

5. Sustainable AI Practices

5.1 Technical Approaches

- **Model efficiency**: Use of pre-trained models, algorithmic optimisation.
- **Hardware utilisation**: Choosing energy-efficient GPUs/TPUs and maximising utilisation rates.

5.2 Infrastructure Strategies

- **Renewable energy adoption** in data centers.
- **Geographical siting** of data centers in cooler climates or near renewable resources.

5.3 Organisational Practices

- **Monitoring AI workloads**.
- **Lifecycle assessment (LCA)** of AI projects before deployment.

6. Policy Recommendations for Sustainable AI

To support sustainable AI development, policymakers must:

6.1 Establish Environmental Metrics

- Define **standardised indicators** for GHG emissions, water use, and biodiversity impacts related to AI systems.

6.2 Expand Data Collection

- Collect AI environmental impact data at **national and firm levels** to enable global benchmarking.

6.3 Improve Transparency and Equity

- Develop public **reporting standards**.
- Promote **resource sharing** and **best practice dissemination**, particularly for **developing economies**.

7. Conclusion

AI is a double-edged sword for the environment. While it contributes to **sustainability goals through efficient applications**, its development and deployment processes carry substantial **ecological costs**. Balancing innovation with sustainability requires a coordinated effort among technologists, policymakers, and industry leaders to implement **standards, transparency, and sustainable engineering practices**.

Marking criteria

Marking Criteria	Marks
Provides a comprehensive analysis of the environmental impact of AI and its applications.	7-8
Provides a descriptive analysis of the environmental impact of AI and its applications.	5-6
Provides some descriptions of the environmental impact of AI and its applications.	3-4
Attempts to relate points of the impact of AI to the environment.	1-2

Sample answer

2025 CSSA, Fam_Q9, Algorithm

Exemplar | Feedback

Question 9

Below is an array that displays the scores of four players from five games of cricket.

	1	2	3	4
1	2	144	5	5
2	3	92	23	20
3	61	0	11	0
4	0	211	58	4
5	5	80	1	0

Scores(1, 2) = 144 represents the score in Game 1 by Player 2.

Write an algorithm that will allow the user to calculate the total of a selected player for the five matches.

Student's answer

Answer not submitted

Marking criteria

Marking Criteria	Marks
Provides a substantially correct algorithm with following features: Selects a specific player Uses a loop to access each score of the player's Calculates the total score Incorporates correct algorithm syntax	4
Provides a substantially correct algorithm addressing most features	3
Provides an algorithm addressing some features	2
Attempts an algorithm	1

Sample answer

```
BEGIN TotalRuns
        SET Total = 0
        INPUT PlayerNumber
        FOR game = 1 TO 5
                Total += Scores(game,
        PlayerNumber)
        NEXT game
        DISPLAY("The total runs of player"
& PlayerNumber & " is" & Total)
END TotalRuns
```

2025 CSSA, Fam_Q10, SQL

Exemplar | Feedback

Question 10

Below is a set of records of students and their grades for an Assessment Task.

students

ID	first_name	last_name	grade
1	Alice	Johnson	88
2	Ben	Lee	72
3	Clara	Smith	91
4	Daniel	Kim	85
5	Ella	Brown	95
6	Felix	White	67
7	Grace	Martin	89
8	Henry	Wilson	83
9	Isla	Davis	90
10	Jack	Taylor	76

Write an SQL query to display the last names and grades from the students table where the student's grade is greater than 85.

Student's answer

Answer not submitted

Marking criteria

Marking Criteria	Marks
Provides a correct answer	2
Provides a partially correct answer	1

Sample answer

```
SELECT last_name, grade FROM students
WHERE grade > 85
```