DatalytIQs Academy

Cambridge International AS and A Level Information Technology 9626

Printable teaching, practice and revision companion

Independent learning resource aligned to the current Cambridge syllabus. This material is original DatalytIQs Academy content and is not endorsed by Cambridge International Education.

Contents and use

1. Data processing
2. Hardware and software
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4. Algorithms and flowcharts
5. E-safety
6. Digital divide
7. Expert systems
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10. Databases
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12. IT in society
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How to study

Study the concept, reproduce the worked method, complete the practical task without copying, answer the examination-style questions, mark with the guidance and record corrections.

1. Data processing

Learning outcomes

Explain the principles of Data processing; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Data processing should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked SQL example

```
SELECT county, COUNT(*) AS learners,
       ROUND(AVG(score), 1) AS mean_score
FROM results
WHERE score BETWEEN 0 AND 100
GROUP BY county
ORDER BY mean_score DESC;
```

The filter protects the analysis from impossible marks. Grouping produces one record per county; aggregation calculates participation and performance. Primary keys prevent duplicate records and foreign keys preserve relationships.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Data processing. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

DatalytIQs marking guidance

Award credit for accurate knowledge, explicit explanation, relevant application and supported evaluation. A high-level response uses the scenario throughout, shows working, distinguishes facts from assumptions and qualifies its conclusion. Brand names alone do not demonstrate understanding.

Common errors

Listing points without explanation; confusing validation with verification; ignoring units or data types; omitting boundary tests; describing features without linking them to the requirement; and giving an absolute conclusion where suitability depends on context.

Revision checkpoint

Without notes, explain Data processing, complete the worked method with new data, identify a limitation and justify an improvement.

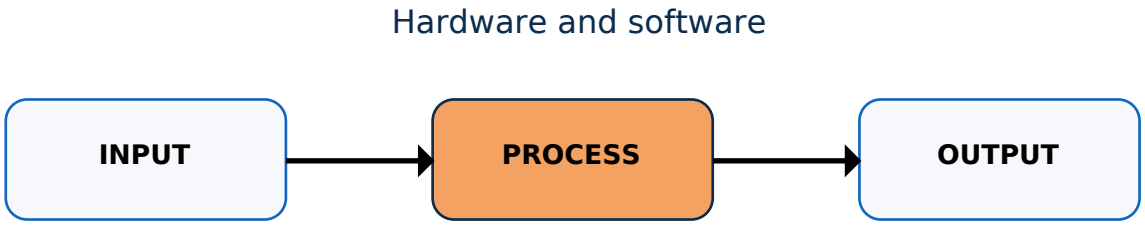
2. Hardware and software

Learning outcomes

Explain the principles of Hardware and software; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Hardware and software should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Hardware and software. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Revision checkpoint

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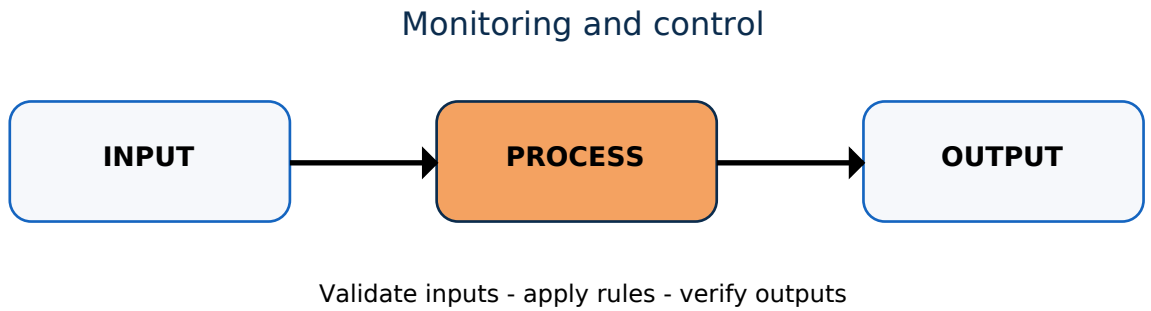
3. Monitoring and control

Learning outcomes

Explain the principles of Monitoring and control; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Monitoring and control should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
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For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Monitoring and control. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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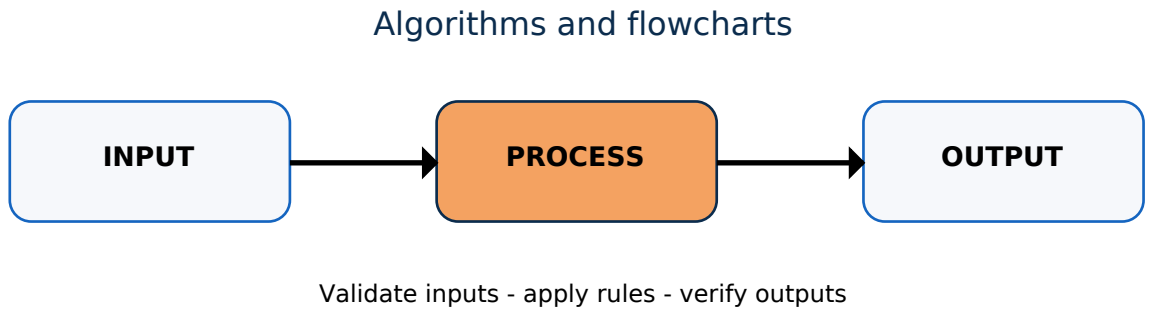
4. Algorithms and flowcharts

Learning outcomes

Explain the principles of Algorithms and flowcharts; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Algorithms and flowcharts should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked program

```
def analyse(scores):
    valid = [s for s in scores if 0 <= s <= 100]
    if not valid:
        return {"count": 0, "mean": None}
    return {"count": len(valid), "mean": sum(valid)/len(valid)}

result = analyse([56, 73, 81, -2, 64])
print(result)
```

The function validates values before calculating. Four observations remain; their total is 274 and the mean is 68.5. Boundary tests should include 0 and 100; erroneous tests should include text and missing values.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Algorithms and flowcharts. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Revision checkpoint

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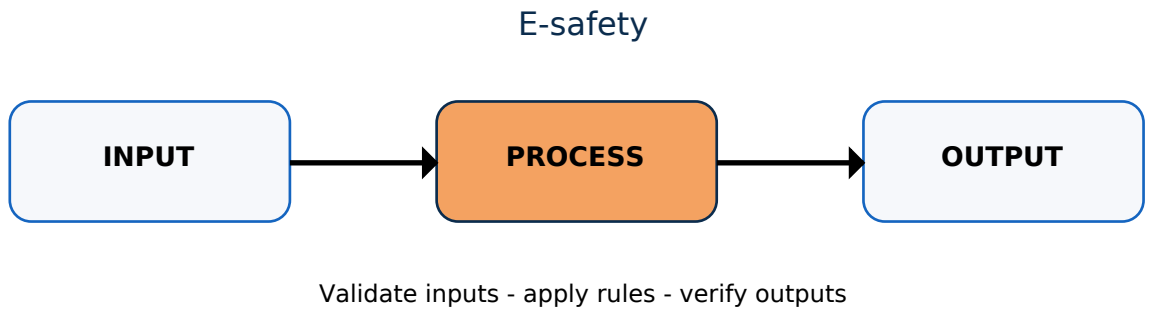
5. E-safety

Learning outcomes

Explain the principles of E-safety; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

E-safety should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in E-safety. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Revision checkpoint

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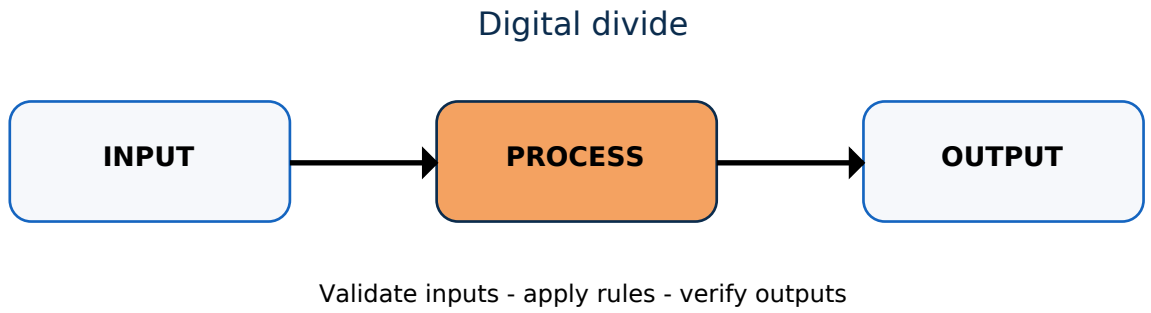
6. Digital divide

Learning outcomes

Explain the principles of Digital divide; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Digital divide should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Digital divide. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Common errors

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Revision checkpoint

Without notes, explain Digital divide, complete the worked method with new data, identify a limitation and justify an improvement.

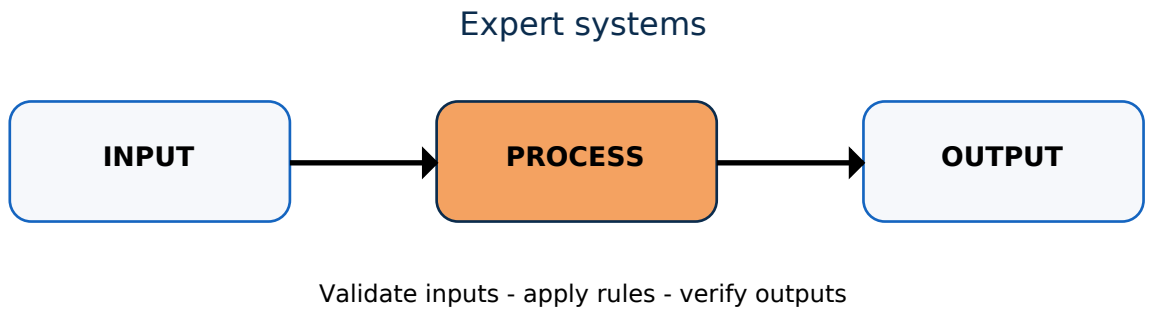
7. Expert systems

Learning outcomes

Explain the principles of Expert systems; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Expert systems should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Expert systems. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Revision checkpoint

Without notes, explain Expert systems, complete the worked method with new data, identify a limitation and justify an improvement.

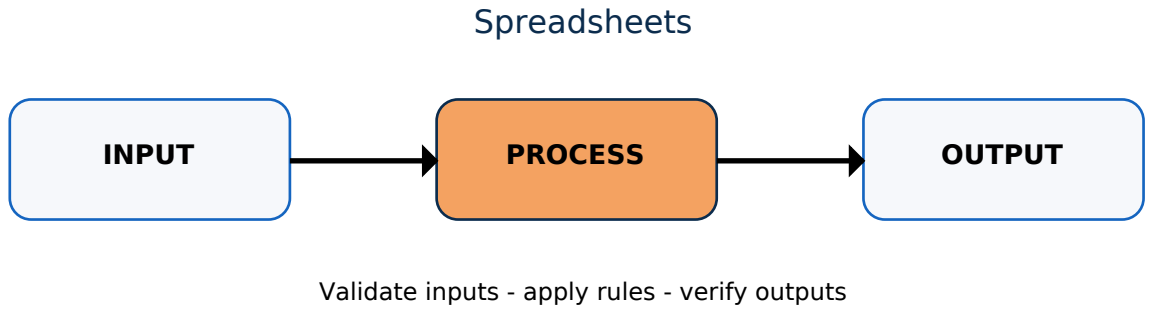
8. Spreadsheets

Learning outcomes

Explain the principles of Spreadsheets; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Spreadsheets should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked spreadsheet model

```
Revenue: =SUM(B2:B13)
Growth: =(B13-B2)/B2
Forecast: =$F$2*(1+$F$3)^A2
Status: =IF(B2>=$F$4,"Target met","Review")
```

Use absolute references for assumptions and relative references for repeated records. Test zero growth, negative growth and an unusually large input. A chart should communicate the trend without decorative distortion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Spreadsheets. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Common errors

Listing points without explanation; confusing validation with verification; ignoring units or data types; omitting boundary tests; describing features without linking them to the requirement; and giving an absolute conclusion where suitability depends on context.

Revision checkpoint

Without notes, explain Spreadsheets, complete the worked method with new data, identify a limitation and justify an improvement.

9. Modelling

Learning outcomes

Explain the principles of Modelling; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Modelling should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked spreadsheet model

```
Revenue: =SUM(B2:B13)
Growth: =(B13-B2)/B2
Forecast: =$F$2*(1+$F$3)^A2
Status: =IF(B2>=$F$4,"Target met","Review")
```

Use absolute references for assumptions and relative references for repeated records. Test zero growth, negative growth and an unusually large input. A chart should communicate the trend without decorative distortion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Modelling. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Revision checkpoint

Without notes, explain Modelling, complete the worked method with new data, identify a limitation and justify an improvement.

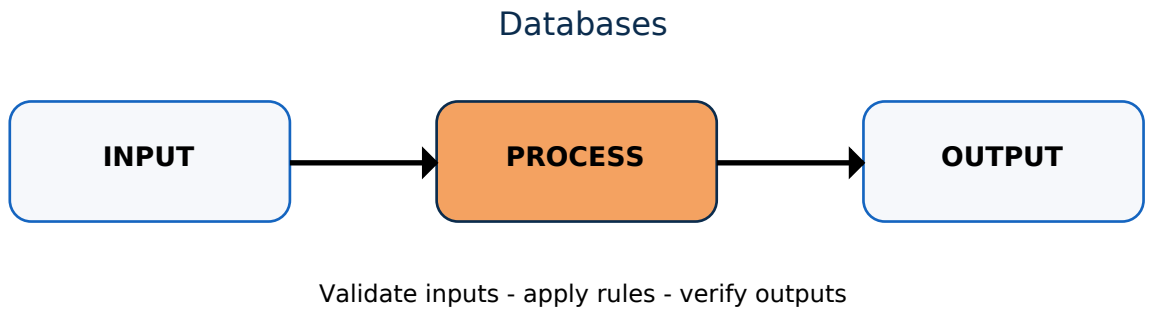
10. Databases

Learning outcomes

Explain the principles of Databases; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Databases should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked SQL example

```
SELECT county, COUNT(*) AS learners,
       ROUND(AVG(score), 1) AS mean_score
FROM results
WHERE score BETWEEN 0 AND 100
GROUP BY county
ORDER BY mean_score DESC;
```

The filter protects the analysis from impossible marks. Grouping produces one record per county; aggregation calculates participation and performance. Primary keys prevent duplicate records and foreign keys preserve relationships.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Databases. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Revision checkpoint

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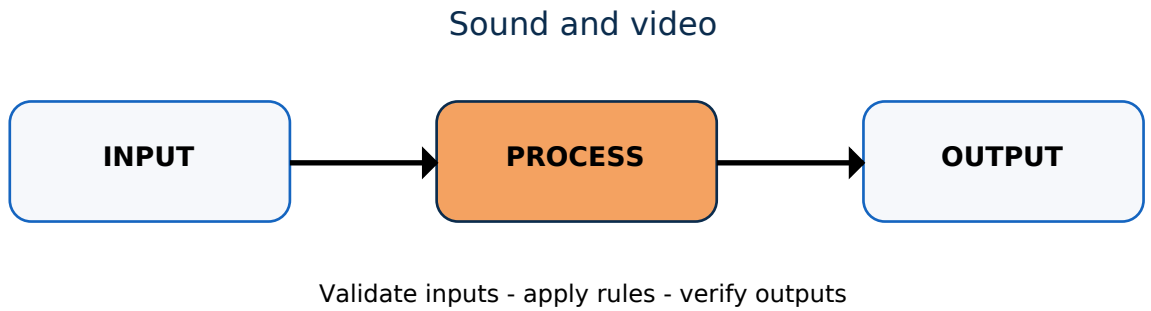
11. Sound and video

Learning outcomes

Explain the principles of Sound and video; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Sound and video should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Sound and video. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Revision checkpoint

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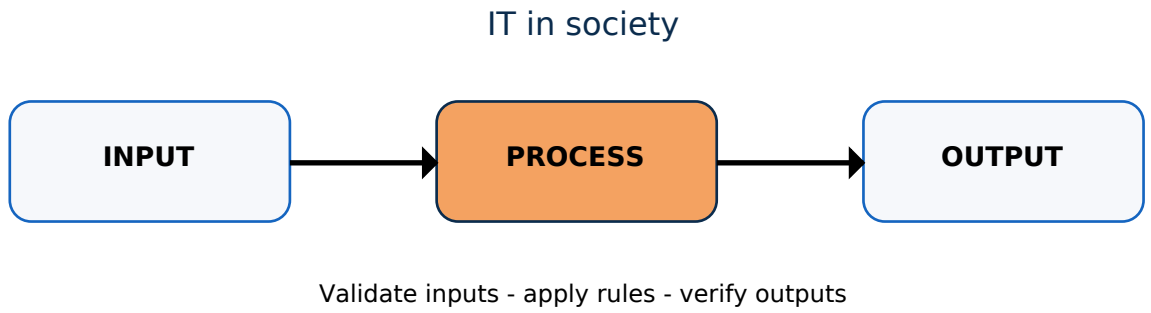
12. IT in society

Learning outcomes

Explain the principles of IT in society; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

IT in society should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
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For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in IT in society. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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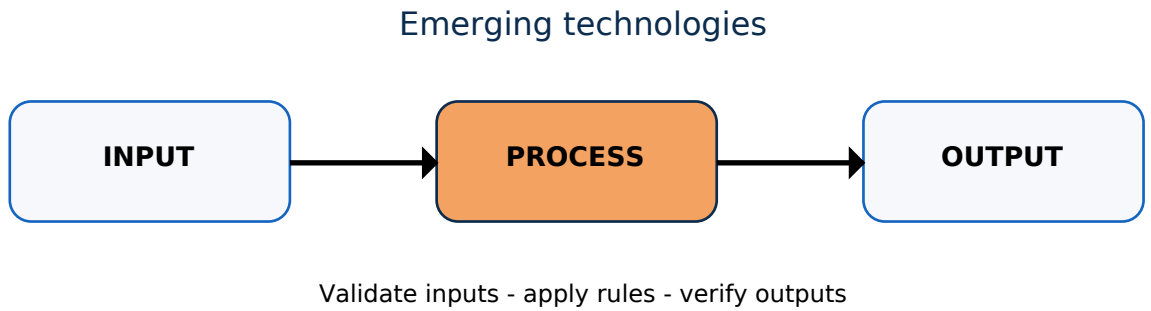
13. Emerging technologies

Learning outcomes

Explain the principles of Emerging technologies; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Emerging technologies should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked application

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Requirement -> suitable input -> controlled processing -> verified output -> evaluation
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For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Emerging technologies. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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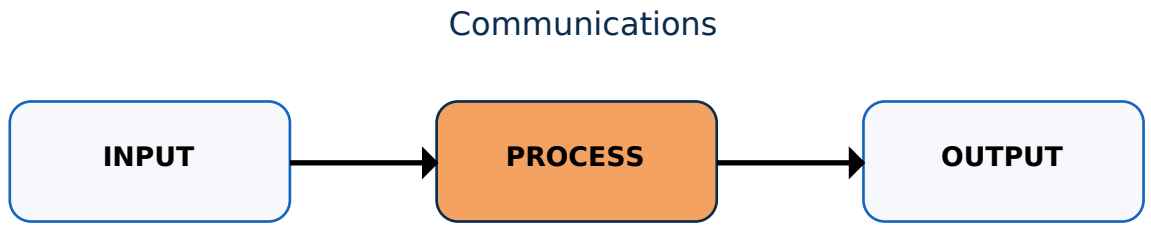
14. Communications

Learning outcomes

Explain the principles of Communications; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Communications should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked application

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Requirement -> suitable input -> controlled processing -> verified output -> evaluation
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For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Communications. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

DatalytIQs marking guidance

Award credit for accurate knowledge, explicit explanation, relevant application and supported evaluation. A high-level response uses the scenario throughout, shows working, distinguishes facts from assumptions and qualifies its conclusion. Brand names alone do not demonstrate understanding.

Common errors

Listing points without explanation; confusing validation with verification; ignoring units or data types; omitting boundary tests; describing features without linking them to the requirement; and giving an absolute conclusion where suitability depends on context.

Revision checkpoint

Without notes, explain Communications, complete the worked method with new data, identify a limitation and justify an improvement.

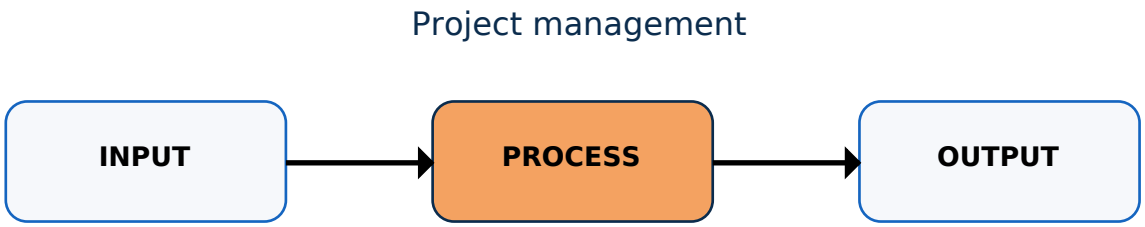
15. Project management

Learning outcomes

Explain the principles of Project management; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Project management should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Project management. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

DatalytIQs marking guidance

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Common errors

Listing points without explanation; confusing validation with verification; ignoring units or data types; omitting boundary tests; describing features without linking them to the requirement; and giving an absolute conclusion where suitability depends on context.

Revision checkpoint

Without notes, explain Project management, complete the worked method with new data, identify a limitation and justify an improvement.

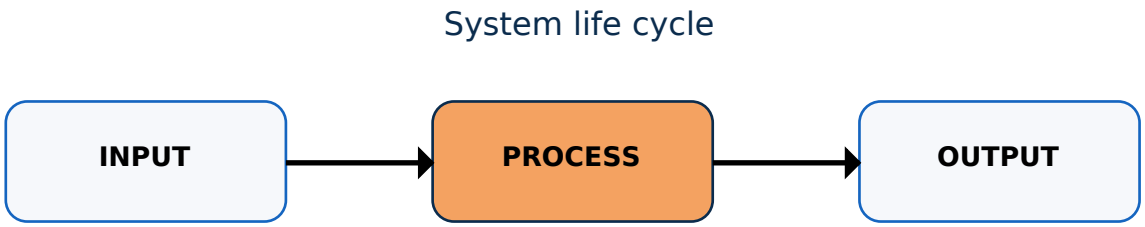
16. System life cycle

Learning outcomes

Explain the principles of System life cycle; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

System life cycle should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in System life cycle. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

DatalytIQs marking guidance

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Common errors

Listing points without explanation; confusing validation with verification; ignoring units or data types; omitting boundary tests; describing features without linking them to the requirement; and giving an absolute conclusion where suitability depends on context.

Revision checkpoint

Without notes, explain System life cycle, complete the worked method with new data, identify a limitation and justify an improvement.

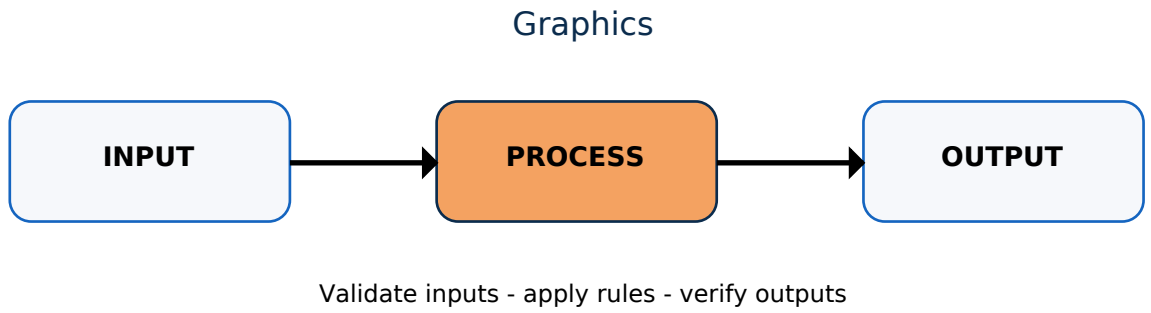
17. Graphics

Learning outcomes

Explain the principles of Graphics; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Graphics should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Graphics. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Common errors

Listing points without explanation; confusing validation with verification; ignoring units or data types; omitting boundary tests; describing features without linking them to the requirement; and giving an absolute conclusion where suitability depends on context.

Revision checkpoint

Without notes, explain Graphics, complete the worked method with new data, identify a limitation and justify an improvement.

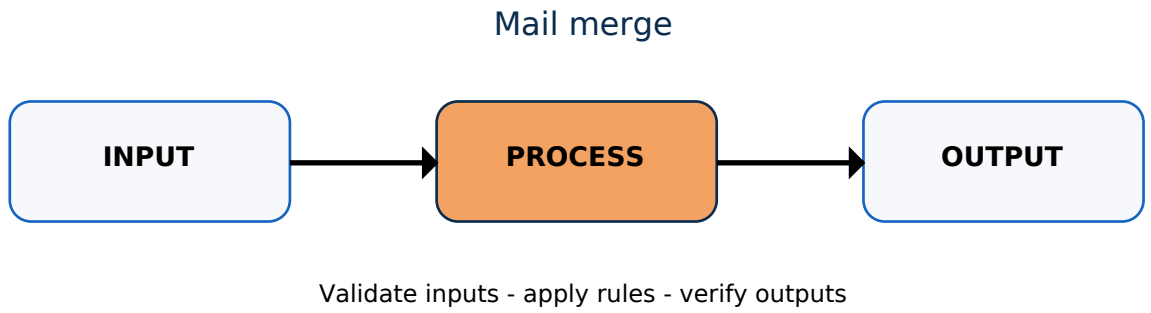
18. Mail merge

Learning outcomes

Explain the principles of Mail merge; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Mail merge should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Mail merge. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

DatalytIQs marking guidance

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Common errors

Listing points without explanation; confusing validation with verification; ignoring units or data types; omitting boundary tests; describing features without linking them to the requirement; and giving an absolute conclusion where suitability depends on context.

Revision checkpoint

Without notes, explain Mail merge, complete the worked method with new data, identify a limitation and justify an improvement.

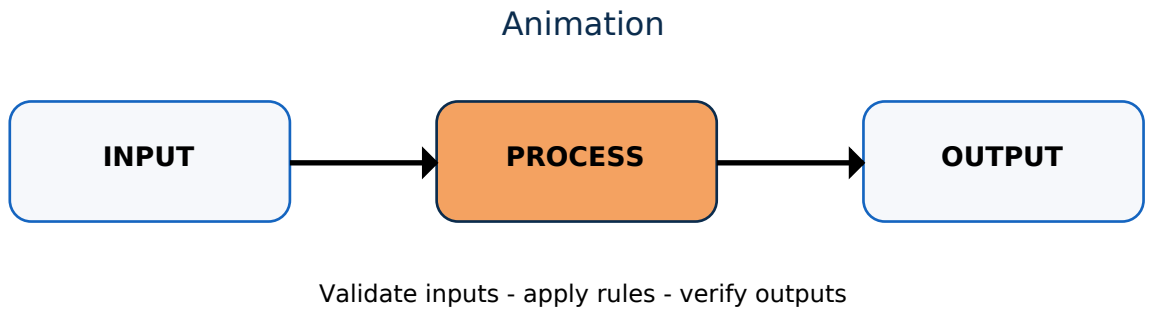
19. Animation

Learning outcomes

Explain the principles of Animation; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Animation should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked application

```
Requirement -> suitable input -> controlled processing -> verified output -> evaluation
```

For a county service register, specify mandatory identifiers, validate dates and categories, restrict access by role, log changes, back up records, and test recovery. Evaluate usability, accuracy, security, cost and inclusion.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Animation. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Common errors

Listing points without explanation; confusing validation with verification; ignoring units or data types; omitting boundary tests; describing features without linking them to the requirement; and giving an absolute conclusion where suitability depends on context.

Revision checkpoint

Without notes, explain Animation, complete the worked method with new data, identify a limitation and justify an improvement.

20. Web programming

Learning outcomes

Explain the principles of Web programming; apply them to an unfamiliar context; select and justify an appropriate method; test or verify the result; and evaluate limitations.

Concept development

Web programming should be understood as part of a complete information system rather than as an isolated definition. Identify purpose, users, inputs, processing rules, outputs and controls. Explain causal links and compare alternatives using suitability, accuracy, efficiency, reliability, security, accessibility, cost and ethical implications.



Validate inputs - apply rules - verify outputs

Worked program

```
def analyse(scores):
    valid = [s for s in scores if 0 <= s <= 100]
    if not valid:
        return {"count": 0, "mean": None}
    return {"count": len(valid), "mean": sum(valid)/len(valid)}

result = analyse([56, 73, 81, -2, 64])
print(result)
```

The function validates values before calculating. Four observations remain; their total is 274 and the mean is 68.5. Boundary tests should include 0 and 100; erroneous tests should include text and missing values.

Practical activity

Use the supplied practical pack. Define the requirement, prepare or import the data, implement the solution, capture evidence of tests, interpret the output and evaluate one improvement. Use normal, boundary and erroneous test data where applicable.

Examination practice

1. Define two essential terms in Web programming. 2. Explain one mechanism using a linked cause-and-effect chain. 3. Apply the concept to a Kenyan school, health facility or enterprise. 4. Construct or annotate an appropriate diagram, algorithm, model or workflow. 5. Evaluate a proposed solution and reach a justified conclusion.

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Common errors

Listing points without explanation; confusing validation with verification; ignoring units or data types; omitting boundary tests; describing features without linking them to the requirement; and giving an absolute conclusion where suitability depends on context.

Revision checkpoint

Without notes, explain Web programming, complete the worked method with new data, identify a limitation and justify an improvement.