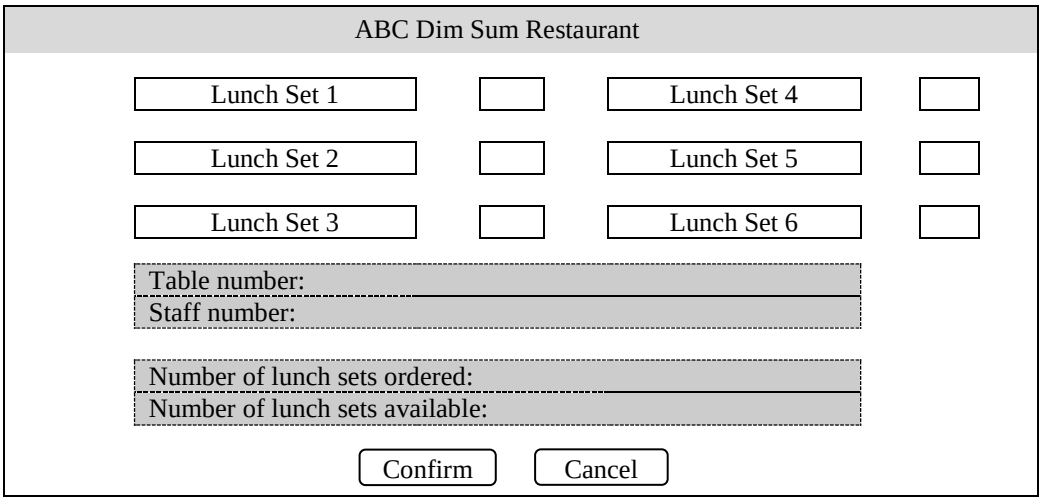
Sample 1

Option A (Databases)

Point-of-Sale System

ABC Dim Sum Restaurant is planning to have a Point-of-Sale (POS) system. The following screen layout has been designed for waiters to use. There is a text box beside each lunch set. They are used to enter the quantities of the corresponding lunch sets.



Task 1 (Design & Implementation)

Create and define the database elements for the screen layout of the POS system.

(a) Define the data dictionary of the database tables involved (e.g. Lunch set, Staff and Order).
(b) Draw an ER diagram and define the corresponding database schema to show the relationship of the tables.
(c) Summarise the sales figures of each day:
    (i) Write an SQL command to list the number of lunch sets for each set sold in descending order.
    (ii) Write an SQL command to list the number of lunch sets for each set sold by the staff member 'Peter'.

Create a prototype of the DBMS of the POS system for the restaurant, focusing on the transaction process. You may consider some of the following key factors when designing the prototype:

- three levels of data abstraction, namely conceptual level, physical level and view level
- relational database design
- data redundancy
- data integrity
- SQL implementation
- user-friendliness

Create a presentation and/or documents to briefly describe the components involved in designing the prototype.

Sample 1

Task 2 (Testing & Evaluation)

Referring to the prototype of the DBMS (*Alternative: According to the prototype of a DBMS stipulated by your teacher*), complete the following tasks.

Conduct a test of the prototype. Collect and record the feedback and results of the test.

Either (i) make one major change in the database design and illustrate the corresponding improvement,

or (ii) describe how the scope of the prototype could be extended.

Create a presentation and/or documents to illustrate the database schema. You may consider some of the following items:

- pros and cons of the DBMS design
- concept of relational database
- database security
- data privacy issues
- data validation and verification
- impact of database development on society

Sample 1

Option B (Data Communications and Networking)

Computers and Network Services on Open Day

ABC school is planning to have an Open Day. All classes have their exhibition booths all over the school including the corridors, halls and playgrounds. Internet access and server access are required so as to help with demonstrations and presentations in the booths. Guests will be able to use mobile devices to vote on their favourite booths.

Task 1 (Design & Implementation)

Use desktop computers and mobile devices to access the Internet and the school servers.

(a) Set up network connecting devices to enable the network connections.
(b) Apply access control and data security.
(c) Use some simple network monitoring software (e.g. Ping, Traceroute and Nslookup) to test and troubleshoot the Internet connectivity.

Create a prototype of the network design for the Open Day, focusing on a floor of exhibition booths. You may consider some of the following key factors when designing the prototype:

- types of network connection
- network infrastructure design
- IP address management
- access control and data security
- cost of network setup
- other special network requirements

Create a presentation and/or documents to briefly describe the components involved in designing the prototype.

Task 2 (Testing & Evaluation)

Referring to the prototype of the network design (*Alternative: According to the prototype of a network design stipulated by your teacher*), complete the following tasks.

Conduct a test of the prototype. Collect and record the feedback and results of the test.

Either (i) make one major change in the network infrastructure design and illustrate the corresponding improvement,
or (ii) describe how the scope of the prototype could be extended.

Create a presentation and/or documents to illustrate the network infrastructure. You may consider some of the following items:

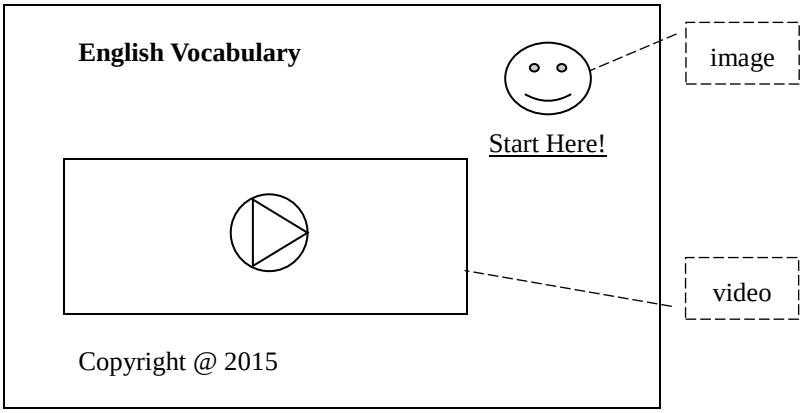
- pros and cons of the network design
- resources and steps involved in the network set-up
- network management and monitoring
- simple fault diagnostic flow charts
- system test plan
- system acceptance checklists

Sample 1

Option C (Multimedia Production and Web Site Development)

English Vocabulary

An English language learning centre would like to build a web site and provide online learning materials for children to learn English vocabulary. The first page of the web site is shown below.



Task 1 (Design & Implementation)

Create and edit the following multimedia elements for the first page of the system.

(a) Append video2 to video1 with a suitable transition effect. Insert some captions in the video when appropriate. Adjust the attributes of the video file based on the environmental factors of the system.
(b) Record an introduction to the games. Adjust the attributes of the audio file based on the environmental factors of the system.
(c) Create an attractive animation using photo1, photo2 and photo3.

When clicking the hyperlink 'Start Here!', users start to browse the learning materials. Create a prototype of the web site with one or more web pages, focusing on the learning materials. You may consider some of the following key factors when designing the prototype:

- web site structure
- audience awareness and friendliness
- sitemap
- the use of multimedia elements
- hardware, platform, language and colour compatibility
- web accessibility

Create a presentation and/or documents to briefly describe the components involved in designing the prototype.

Sample 1

Task 2 (Testing & Evaluation)

Referring to the prototype of the web site (*Alternative: According to the prototype of a web site stipulated by your teacher*), complete the following tasks.

Conduct a test of the prototype. Collect and record the feedback and results of the test.

Either (i) make one major change in the web page design and illustrate the corresponding improvement,

or (ii) describe how the scope of the prototype could be extended.

Create a presentation and/or documents to illustrate the web site. You may consider some of the following items:

- pros and cons of the web site design
- how the editing of the multimedia elements compromises the environmental factors of the web site
- how the prototype addresses the key factors of a good web site
- how the evaluation helps to improve the web site

Sample 1

Option D (Software Development)

Composition Analyzer

A composition analyzer is an analysis tool used by English teachers to generate statistical information about English compositions written by students. It is a program that can evaluate the quality of English compositions. Some examples of statistical functions of the composition analyzer are shown below:

- frequencies of letters
- frequency of a given word/expression
- total number of words
- total number of paragraphs

Task 1 (Design & Implementation)

Create and define the following components of the problem-solving procedures of the above program.

(a) Select data types for two of the statistical functions mentioned above.
(b) By using stepwise refinement, describe an algorithm for calculating the frequencies of letters.
(c) Use a flowchart to describe the algorithm in (b).

Write a program to implement the composition analyzer with not more than four statistical functions with a plain text format for input, an analysis report for output and samples of English compositions for program testing. You may consider some of the following key factors when designing the program:

- data structure
- variable declaration and initialization
- data collection, input and validation
- data processing
- program output
- interface of the program
- modularity
- reusability

Create a presentation and/or documents to briefly describe the components involved in designing the program.

Task 2 (Testing & Evaluation)

Referring to the program (*Alternative: According to a program stipulated by your teacher*), complete the following tasks.

Conduct a test of the program. Collect and record the feedback and results of the test.

Either (i) make one major change in the program and illustrate the corresponding improvement,
or (ii) describe how the scope of the program could be extended.

Create a presentation and/or documents to illustrate the development of the program. You may consider some of the following items:

- pros and cons of the program design
- test cases
- unit test
- system test
- user acceptance test
- algorithm optimization