# Criterion B: Analysis

## Proposed solution:

The following solutions were suggested by the client:

- A **Google/Microsoft form** - shared with all students during the time of Internal Assessments
- A **Microsoft Access Database** - with relationships and navigation form accessible to students
- An **HTML Website -** hyperlinked to the school's website

The client has chosen a Microsoft Access Database as their final solution because it provides an organized interface, allows validation and verification of data entered, permit only authorized personnel for full access and is more efficient than google forms or an HTML website.

# Requirement specification

## IT system requirements

**HARDWARE**

- Desktop/PC with Windows 10 OS, LCD Display (Minimum Requirements: 1GHz Processor Speed, 8 GB RAM, 20 GB HD)
- Mouse with USB Interface/Connector
- USB Flash Drive (for backup) with 8 GB Capacity

**SOFTWARE**

- Microsoft Access (2010 or greater) – for creating the database
- Microsoft Excel Spreadsheet (2010 or greater) - for importing previous records
- Adobe Acrobat Reader - for printing receipts & queries in pdf
- Notepad (with relevant passwords) of the database.
- Adobe Photoshop for logo & image editing

## System interaction

The following system interactions will take place:

- Excel Spreadsheet (basic database files) and Microsoft Access is functional on the Desktop/PC
- Data from the excel spreadsheet will be imported to Microsoft Access
- Images and Logo will be imported from Adobe Photoshop to Microsoft Access in JPEG format

- Microsoft Access compatibility with Adobe Acrobat Reader for printing receipts and queries into a pdf file type
- Pictures (for Background & Logo) are supported on Microsoft Access
- Database compatibility with the USB Flash Drive

## Input/output requirements

### Input requirements

- The department's Equipment/Apparatus data (provided by the client) with relevant specifications (quantity, uncertainty, description, type: Vernier, Digital, Analogue)
- Students personal information (+ primary keys as their student ID provided by the school)
- School Logo, Text about the missions and values of the school (Provided by the client)
- Images (.jpg file) of Background related to chemistry (from the Internet)
- Entity-relationship diagram (for relationships between primary and foreign ID)

### Output requirements

- Receipts of Delivered Equipment printed (in .pdf)
- Home Navigation Form (set as default page) of the database
- Tables with users (lab technicians, students, teachers) personal information
- Forms for inputting new data
- All operations buttons (open-form, close-form, next record, previous record, filter etc.) running correctly performing assigned tasks
- Parameter queries(s) of the orders (of equipment): by pending delivery, returned/unreturned equipment, broken glassware or malfunctioned equipment.

## Processing

- Apply input masks for correctly formatting date of order/delivery, time, student IDs, email addresses, phone numbers etc.
- Validation rules for dates of birth (being in line with corresponding year group's age)
- Length checks using field size property
- Running relationships between sets of tables and data
- Creating reports of lost, misplaced & broken apparatus

## Security

The following measures will be taken to ensure that the database and its content are secure:

- The Microsoft Access Database will be backed up weekly onto the USB flash drive, to prevent loss of data caused by crashing or corruption.
- Encrypt a Database password to prevent guests or individuals outside of school to view forms or enter/manipulate data.
- School Logo will be present on every form as a verification, to ensure that this is the authentic version of the database provided by the school.
- Encrypt Admin/Lab technician forms with hard code embedded passwords to prevent students from viewing the entire database and to avoid unauthorized personnel getting access to the school's and students' personal data.

## Specific performance criteria

a) The school logo must be visible on all forms and the access switchboard.

b) The background and colour scheme is consistent throughout the database.

c) All operation buttons on the forms must be bright and distinct for visibility.

d) All forms, receipts and tables are hyperlinked in one platform (switchboard).

e) All equipment/lab apparatus is categorized into Vernier, Analogue & Digital.

f) Validation and verification rules are applied for fields where appropriate.

g) The database has all forms appearing as pop-ups.

h) All buttons, text boxes, the background is evenly orientated and centred.

i) The database is encrypted with a password.

j) All operation buttons are functional and navigate to the correct forms.

k) The database opens by default with a home navigation form.

l) The relationship page creates one-to-many relations between all primary and secondary IDs.

m) All data is only accessible to authorized personnel.

# Justification of chosen solution

The chosen solution is Microsoft-Access Database as it fulfils my client's expectations. Previously tried solutions, such as google-spreadsheet, email-order-deliver and paper forms, had limited success because they were very time-consuming.

This solution is more practical instead of other proposed solutions (HTML website and google/Microsoft forms). HTML websites pose additional costs for the hosting/domain-name and require regular updates to ensure that the website is secure, consequently, the process between the department and the school IT will be quite large, which makes it time-consuming for my client's department to make instant changes. Likewise, a google/Microsoft-form wasn't feasible, because it'd need multiple-forms to create for students to change their order, to add new equipment and there is a higher probability of mismanagement.

A database has an organized interface, free-of-cost (for development), and efficiently monitors the distribution of all apparatus with input masks, verification and validation rules and also since it's very time efficient. As the client suggested, this database can be stored on the lab's desktop computer and students can wish to order equipment when necessary. A database is very effective in organizing and categorizing incoming data into specific filters using parameter queries which makes it easier for my client to filter overdue apparatus.

My client and her department members are provided with Office Accounts by the school; therefore Microsoft Access is compatible with my client's hardware and software and my PC. The content/data will be provided by the client (including student, staff, apparatus description). The database will be created within 5 months to meet my client's deadline. I'll learn and practice via tutorials online to familiarize myself with Access functions.

Security and privacy conventions are imposed using the encrypted password on database, and hard-code embedded passwords placed on admin forms (only available to authorized members). These credentials will be given to client during the training. Necessary training after development to add/modify/manipulate data will be provided to my client to maintain the database for future needs. The product will be accessible to the client via an offline Microsoft-Access database file stored on my client's desktop, along with a notepad-file (containing the database passwords).

**Word Count:** 350