# Criterion B: Analysis

## Proposed solution:

Mr Cole and I considered the following options:

- An improved paper based system

- A spreadsheet to maintain data about students and organizations

- A database to maintain data about students and organizations

After discussion, we decided upon using a database to solve his problems.

# Requirement specification

## IT system requirements

- **Hardware:**

  o A PC capable of running Microsoft Access 2007

    ▪ 500 MHz processor, 256 MB RAM, 2GB hard disk space

    ▪ Microsoft Windows XP with Service Pack (SP)

    ▪ Source: Microsoft Corporation (http://www.microsoft.com/officebusiness/products/technical-requirements.aspx)

  o A USB flash drive for backup purposes

  o A digital camera and memory card are needed for the optional student photos, plus a memory card reader or a USB cable to transfer the photos.

  o A printer is optional but not required

- **Software:**

  o Microsoft Access 2007

  o Microsoft Windows XP Service Pack 2 is a minimum requirement for Microsoft Access

  o Basic image editing software to resize the (optional) student photographs

## System interaction

- The database must be created in Microsoft Access 2007 format (rather than a later version) to be compatible with the version of Microsoft Office available on the school computers.
- A compatible digital camera is needed to import the optional student photos

## Input/output requirements

**Input during set-up (entered by me during the creation and testing phases):**

a) Student details: Name, Award stage and progress (Bronze, Silver, Gold and In-progress or completed), plus a photo
b) Adventurous journey details: date and place of the trip, the type of trip (practice or final), and a list of the students who attended.
c) Organisation details: Name of organization, contact details (email and telephone number), type of activities offered (skill, physical recreation, service), a brief description of the activities, and the number of students required.

**User inputs (entered by Mr Cole during use):**

Mr Cole will provide the data listed above for a sample of the current students, organisations, and trips. He will then enter the same data himself for new students and organisations which are added after the database has been completed and handed over.

Data entry for Mr Cole needs to be completed using Forms rather than the Microsoft Access datasheet table view

**Output requirements**

a) A list of all trips and activities undertaken by a given student
b) A list of all students who have completed a certain level of the award (Bronze, Silver, or Gold) but not yet received their certificate
c) A list of all students attending a giving activity or trip
d) A list of all students whose diaries have not been checked in the last two months (this time period should be configurable by Mr Cole)

## Processing

- A graphical menu (switchboard) should be used to provide access to the database functions
- Graphical data entry forms should be used instead of the Microsoft Access datasheet view
- Data entry fields need to be validated (see Criteria D for the precise specifications)

## Security

- Since the database will contain students' personal details, including photos and the locations they are attending, the database needs to be password protected against unauthorized access.
- A method of backing up the database is needed

# Specific performance criteria

To test if the database meets Mr Cole's requirements:

a) The lists described under "Outputs" above must be available
b) An easy to use and intuitive graphical front end must be included
c) Data must be validated to ensure consistency and remove redundancy
d) The database must be secure against unauthorized access
e) A method of backing up the database must be available

# Justification of chosen solution

A database will be the best solution to Mr Cole's problems, providing a safeguard against lost data if student diaries are lost (only the student's most recent entries will be lost). Database queries will enable Mr Cole to generate lists of students meeting different criteria, such as those who have completed all requirements and need awarding the certificate, or those attending a certain activity.

Continuing with an improved paper based solution was not considered practical. Providing a backup copy of student's diaries in these situations is too difficult and would involve either photocopying or scanning them. This would still make indexing them too difficult.

A spreadsheet would enable Mr Cole to organize the data more effectively, but lacks the capability of extracting data easily using queries. This would be a particular problem as Mr Cole has around 30 new students entering the International Award programme each year, so the amount of data will grow quite quickly. Spreadsheets also provide limited opportunities for data validation compared to databases.

A database is therefore the preferred solution, as it addresses each of the problems described by Mr Cole. Data can be stored in related tables which reduce redundant data and allow it to be quickly access through Select or Parameter queries. Microsoft Access has built in functions for creating graphical menus ("switchboards") and user input forms to provide a friendly user interface. Data validation can be achieved using input masks and validation rules.

Microsoft Access was chosen over popular databases such as MySQL because it offers an easier way to produce an easy-to-use graphical interface (forms), and the complexity of MySQL is not needed in this situation. LibreOffice database was considered, however this is not available on the school system (though it could be installed for free), and Mr Cole has no experience with it. In contrast, he has some experience with Microsoft Access, and Access is already pre-installed on the school's computers.

The school also has digital cameras and basic photo editing software which can be used to capture the optional student photographs.

The database can also be stored on the school's server, which is automatically backed up periodically.

Word count: 357