# Project Report

# Student Book Pro

Student Book Pro is a software application for education establishments to manage students' data.

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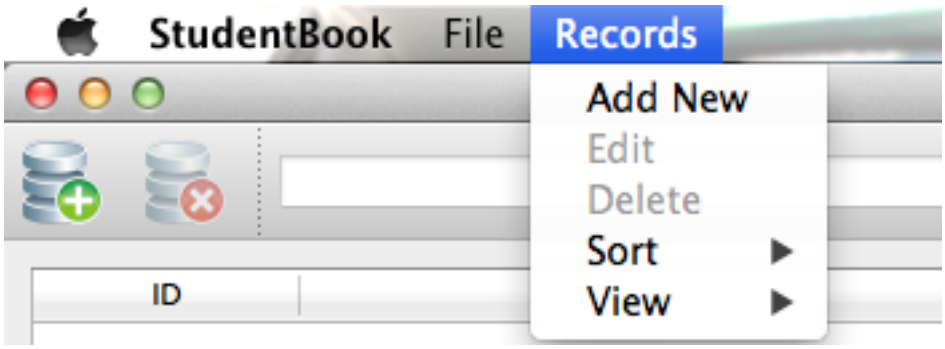
# Manual Guide

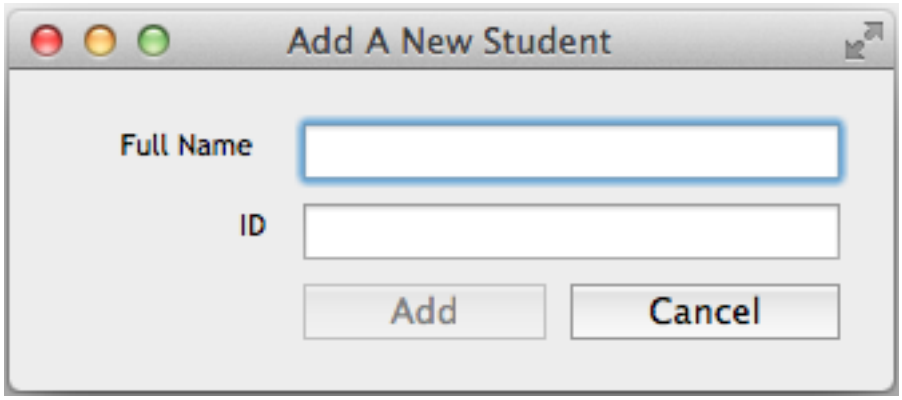
- **Add a new Student**

  To add new student you have two ways:

  - By pressing  on the button in the tool bar.
  - By pressing Records → Add New.



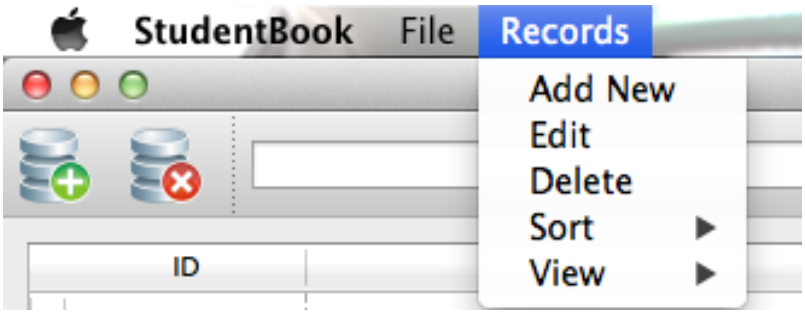

Both ways will lead you to the window of adding a new student



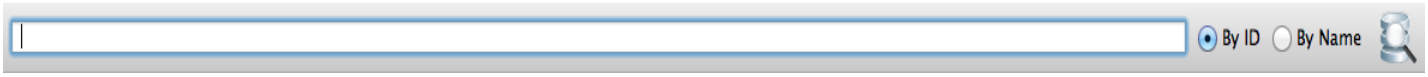
- **Delete a student** 

  To add new student you have two ways:

  - By pressing on the button in the tool bar.
  - By pressing Records → Delete.




- **Search for a student**




You two types of search:

1. Search by Id.
2. Search by Name.

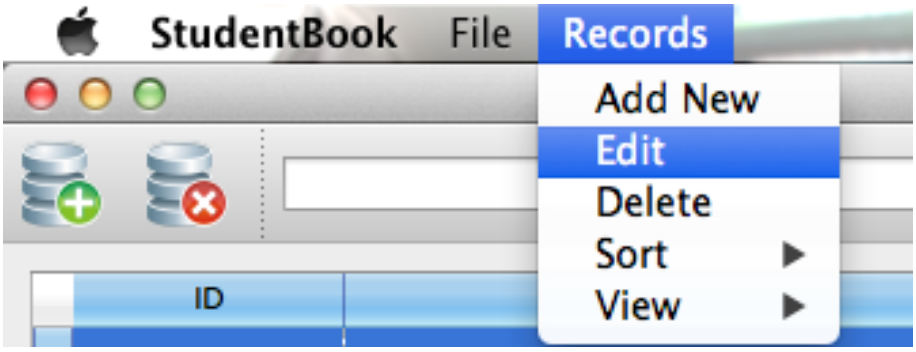
Choose between searching by id or by name then press  or press “Enter”.

- **Edit a student’s data**

To edit the id or the name you have two choices:

1. By double clicking the data you want to modify.


2. By pressing the data you want to change then go to Records → Edit.

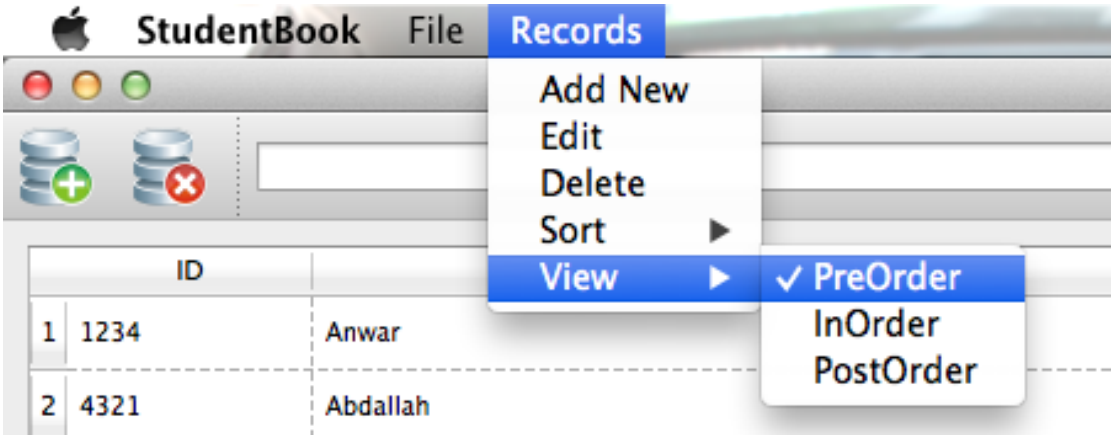


- **Sort the list**

  To sort the list you can sort by id or by names
  Go to Records → Sort.


- **View List (Inorder/Preorder/Postorder)**

  You have the choice to change the view to inorder or preorder or postorder. Go to Records → View.

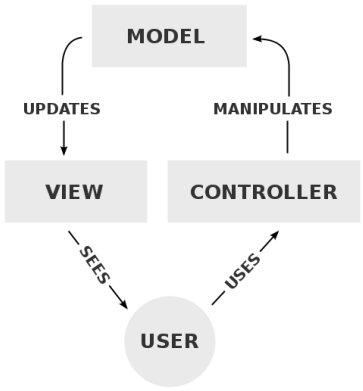



- **Open and Save a file**

  To open or to save a file, go to File → Open or File → Save.

# Technical Specifications

- Student Book Pro Graphical User Interface is based on Qt, a cross-platform application and UI framework for developers using C++ or QML, a CSS & JavaScript like language.
- It is based on MVC architectural pattern, Model–view–controller (MVC) is a software architectural pattern for implementing user interfaces. It divides a given software application into three interconnected parts, so as to separate internal representations of information from the ways that information is presented to or accepted from the user.




- Students' data are represented inside a Binary Search Tree where Insertion, Edition, Deletion and Searching occur through it. The data is stored inside a structure per student where the pointer of this structure is saved inside a new node in 2 binary search trees, one sorted by ID & the other sorted by Name. By this technique we have eliminated the memory usage since we have avoided the duplication of data inside each tree.

- The deletion technique implemented in this software is intelligent enough to delete both nodes from each binary search tree in a complexity of O(1). This was achieved by saving the pointer of each node inside each binary search tree in the structure for data per student.

- During opening a data store, students' data are imported and balanced inside the internal binary search tree.

- The Model is interconnected with the View through a double linked list implemented with an iterator control that helps iterating on the whole linked list.