A Hands-on Approach to Learning Molecular Biology Techniques

Ross Eric Barnie
Dmitrijs Jonins
Daniel McElroy
Murray Ross
Ross Taylor

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The overall aim of this project is to produce a piece of software to help Molecular Biology students learn about PCR and Primer Design Techniques and to allow them to test their knowledge of these subjects. Initially, this overall aim was divided into key tasks to be completed and important aspects of the interface design to be implemented:

1. The software should work as an interactive tutorial which users can work through. This requires:

    - A number of areas for users to enter their own choice of data e.g. choice of primers. For this feature to be useful as an educational tool feedback must be provided upon data entry.
    - Users should be able to experiment with different data e.g. examining the different melting temperatures of different primers. This requires the ability to easily move forwards and backwards between the different stages of the tutorial.
    - To help newer users and students who are unfamiliar with PCR there should be simple instructions to tell users what to do on each page. There should also be a page displaying the rules of PCR and primer design which should be available at all times.

2. The software should be useable by all users, regardless of their different levels of knowledge, ability etc. This includes:

    - To achieve this, the interface should be uncomplicated and intuitive without compromising the required functionality. This will be aided by the instructions and help section mentioned above as well as labels placed next to any areas users can interact with.
    - Any section which makes use of colour should be designed with colour blind users in mind.

3. The software should improve upon the tools currently available for learning primer design. The main issues with these systems are:

    - The low level of interactivity offered by the systems. Users who are not actively working through a tutorial or a demonstration are likely to lose interest faster so it is important to make them involved with every step of the tutorial by having them design their own primers etc.
    - The available tools rarely go into detail about primer design specifically. Therefore, an important aim for the project is that primer design must be explained in high detail and provide enough information to be informative, whilst remaining interesting to students using the system.

4. Another aim related to accessibility is that the users should be able to download and use the software from home. This means that the program must be able to run on a variety of different operating systems and computers with varying performance levels. With this in mind it was decided that the program should be written in Java due to it being highly portable.

1.3 Background

1.4 Motivation

References