University *of* Glasgow | Department of Computing Science

D3: REQUIREMENTS DOCUMENT

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Project	Team Project 3: Interactive Primer Design
Team	Q
Authors	Ross Eric Barnie Dmitrijs Jonins Daniel McElroy Murray Ross Ross Taylor
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Contents

1 Introduction

1.1 Identification

This document outlines the Requirements Specification of the Interactive Primer Design system required by the clients. See section 2 for the definition of the problem the system will solve.

1.2 Related Documentation

PCR Design Principles (Summary of Meeting on 10/10/2012)

- See section B

List of Animations Involving PCR Provided by Clients

- `http://www.youtube.com/watch?v=XXkG6m3yT1M&feature=youtu.be`
- `http://ibls.moodle.gla.ac.uk/mod/resource/view.php?inpopup=true&id=33097`
- `http://learn.genetics.utah.edu/content/labs/pcr/`

1.3 Purpose and Description of Document

This document will serve as an agreement between the client and Team Q as to the requirements of the system. Any disagreement between the two parties regarding these requirements will be documented here along with details on how this was resolved.

1.4 Document Status and Schedule

Currently this document is in draft and scheduled to be finalised pending review and approval from the clients on 7th November 2012.
The next draft of this document (version 1.1) will include all notes from group meetings and client meetings taken by Team Q and will be included in appendix B. Any changes requested by the clients will also be added for this version.
After which the document will be updated iteratively as changes arise and will be re-approved by the clients before being re-released.

2 Extended Problem Defintion

Molecular Biology students are required to learn PCR and Primer techniques as part of their 3rd year curriculum. This system being designed will allow students to use the application to test their knowledge of these concepts. Users will access the NCBI database and copy and paste a DNA section into the application. The system will then tell them if this is the correct seqenence. Users will then be asked to select which lines of DNA code they would like to use for the PCR product. Once this has been selected, they shall pick a forward primer pair and backward primer pair. Once these have been selected, various help methods will appear to help the user pick the right one. Once correct primer pairs have been picked, the melting temperature of both primers will be calculated and displayed on screen.

3 System Scope

The main aim of this system is to act as a teaching tool to aid students in learning how to design primers for PCR experiments and should be usable in a teaching environment or by people on their home computers.
It should function as an interactive, step-by-step guide through the process of PCR on a DNA sequence of the users choice. The user is required to access the NCBI website and copy and paste their choice of DNA sequence into the system. The system should provide feedback if the user enters incorrect primers. The system should then check if the melting temperatures of the primers are in the required range. The user is then given a link to perform primer blast to check if the primers they have chosen are unique.
The system should also provide the user help with completing each task by providing relevant rules for each task and giving the user instructions about how to use websites and resources outwith the system (NCBI, primer blast etc.).
When the user has provided an appropriate pair of primers the system will then show an animation of the PCR reaction taking place.

4 Non Functional Requirements

- The system is expected to be used at students' homes or in the Biology lab computers, so portability is essential for the system to work to the clients' expectations.

A Glossary

PSD or PSD3 Professional Software Development 3, a compulsory level 3 Computing Science Course designed to teach students how to develop software in a professional manner

GitHub GitHub refers to the website `github.com` which hosts the git repository for our project's documentation and implentation at `https://github.com/Dan-McElroy/Team-Project--Q`

Git Git is a version control system used by Team Q to keep track of all digital files related to the system. Not to be confused with the term of 'endearment' in the English language.

TP or TP3 Team Project 3, a compulsory Level 3 Computing Science module where students are required to produce some piece of software. In our case, this system.

Portability A system which is portable is able to be used on a different computer to the one on which it was developed with no, or minimal, changes.

B Client Meeting Documentation

B.1 Summary of meeting from 10th October 2012

During the requirements elicitation process, the clients submitted a hand-written document of how they envisioned the system.
The first two pages contain instructions for how the user would interact with the system, as follows:

- Open NCBI
- Type Acc. # [Accession Number, used to locate the required sequence] into search
- Pull out section of sequence which contains relevant bit for PCR (500 bases?)

This leads on to a section about primer design, interwoven with diagrams to illustrate their intention. In this document, the plan follows that the user would choose from a list of 6 potential primers for each strand of the sequence.
If the primer chosen is unsuitable, the user will be presented with a clue to inform them why that particular primer would not be suitable.
The user would then be prompted to return to the NCBI website, search for the primer sequence using the website's specialised search engine, and if it is unique, the system would move on.
The last page contained all the basic rules involved with primer design, which would need to be checked against for the user's choice.