edexcel
advancing learning, changing lives

Project Proposal form

Learner Name	**Ashwin Ahuja**	**Learner number**	**5501**
Centre Name	**St Paul's School**	**Centre Number**	**14627**
Teacher Assessor		**Date**	**18/10/2015**
Unit	**P304**		

Proposed project title **User Friendly Secure Handheld Password Manager**

Section One: Title, objective, responsibilities

Title or working title of project (in the form of a question, commission or design brief)

To produce a design for the mechanics, electronics and software of a secure handheld method to store passwords, ensuring it is not hackable by current means – and thus more secure. It should make use of biometrics to ensure that the products only respond to the intended user. It should also be easy to use, to attract especially those who travel frequently and for the elderly.

Project objectives (eg, what is the question you want to answer? What do you want to learn how to do? What do you want to find out?):

To Research:

a. Current hacking techniques.
b. Different algorithms for encryption and their various merits and flaws.
c. The material sciences related to materials that could be used with the product.
d. Anthropometric data related to ease of use of the product.
e. Different methods by which the product could be manufactured, based on different materials.
f. Possible Control System components, for example which microcontroller to use.

To Learn How:

a. To use 3D simulation software to conduct stress analysis upon the materials to produce the product.
b. To design algorithms for encryption.

To Define and Justify:

a. The Structure and Geometry of the product, as well as the materials used.
b. The manufacturing processes required to produce the product
c. Electronics of the product, to allow the user to easily find their passwords in all conditions, and also add them comfortably
d. The Algorithms used in the product to ensure that it is secure and insusceptible to current hacking techniques.
e. The Biometrics used in the product, to draw the best balance between the product being as secure as possible, as well as easy to use on a frequent basis.

If it is a group project, what will your responsibilities be?

N/A

Section Two: Reasons for choosing this project

Reasons for choosing the project (eg, links to other subjects you are studying, personal interest, future plans, knowledge/skills you want to improve, why the topic is important):

- I am a keen user of the internet – attempting to make use of all the innovative new mechanisms to improve and manage my life on the internet. Additionally, as a careful person, I am attempt to make my passwords as secure as possible (most sources recommend at least one number, lower-case letter, upper-case letter and special character). This is very challenging to remember; especially given that we should have a different password for each website. Thus, I store my passwords on a cloud document, which is difficult to find and use on the move, as well as being liable to being hacked and used. So a product like this would solve a specific problem I have.
- The product would allow me to investigate security and encryption, which is an interest of mine – as I have previously produced biometric security devices for my home. It would also allow me to investigate the algorithms behind encryption, which ties well into my planned university degree of Computer Science and Maths.
- The project allows me to improve my project management abilities, including how best to organise my time during the project, an important skill for future jobs.
- The product also allows me to investigate the product design aspect of the product, including the choice of specific materials, linking well with the Physics A2 Course that I am currently completing. I am interested in seeing how various materials might respond especially to the stresses created by the design, both of various physical forces and indeed the heat created by the internals of the product.
- I am also interested in the potentials of the product for the mass market – replacing the methods of password storage (which are generally liable to being hacked into (or physically stolen)) and being used. I am especially interesting in targeting the product to the elderly, who (as I have spent time teaching the elderly to use computers in my local area) struggle to store passwords online – so I hope I could make the product easy to use for them.
- The product would allow me to gain an insight into the fast expanding field of biometrics, as fingerprint sensors are introduced to smartphones, iris to airport security and so forth. The project would allow me to research the merits of various types of biometric security.

Section Three: Activities and timescales	
Activities to be carried out during the project (eg, research, development and analysis of ideas, writing, data collection, numerical analysis, rehearsal techniques, production meetings, production of final outcome, administration, evaluation, preparing for the presentation, etc):	How long this will take:
1. Research 1.1 – The problem and target markets. 1.2 – Current Password Management solutions on the market. 1.3 – Control System Possibilities. 1.4 – Possible materials and designs for the product (including looking at anthropometric data to ensure it is comfortable to hold). 1.5 – Existing Algorithms for Encryption. 1.6 – Types of Biometric Security. 1.7 – Current hacking techniques, and thus how to ensure the product is insusceptible to these techniques.	5 weeks
2. Designing 2.1 – Produce designs for the structure of the product. 2.2 – Produce a description of the aims of the control system and user interface, and preliminary ideas of how the product could be designed electrically.	4 weeks
3. Development 3.1 – Conduct Stress Analysis on a few design options to ensure the product is strong enough to be carried around every day. 3.2 – Further investigate the most suitable components of the Control System.	4 weeks

3.3 – Investigate which forms of biometric (and other) security measures are the most useful for the product.	
4. Completion 4.1 – Define and justify the control system. 4.2 – Define and justify the design of the product & the manufacturing techniques used to mass manufacture it. 4.3 – Define and justify the encryption and security measures of the product.	4 weeks
5. Writing 5.1 – The Project Report 5.2 – The Presentation (including rehearsing it)	5 weeks

Milestone one: Complete Research

Target date (set by tutor-assessor): 17th December

Milestone two: Finish final product design

Target date (set by tutor-assessor): 20th February

Section Four: Resources

What resources will you need for your research, write up and presentation (eg, libraries, books, journals, equipment, rehearsal space, technology and equipment, venue, physical resources, finance):

I plan to make use of the following pieces of software:

- Microsoft OneNote – For collating files and information from all stores as well as my personal thoughts
- Microsoft Word – For writing the Final Project Report
- Microsoft Excel – For organising and analysing numerical data
- Xamarin Studio or Microsoft Visual Studio – For programming any pieces of example code in C languages if required
- VIDLE – For programming in Python – especially if a Linux Microcontroller is used
- SolidWorks 2014 (with Simulation add-on) – For Modelling and Simulation
- Arduino – For any programming if an Arduino Microcontroller is to be used

I plan to make use of the following pieces of hardware:

- Any components required
- 3D printer – for any pieces of prototyping
- A computer – to run all the pieces of software required

The following other resources will be used:

- The Walker Library – especially for books related to encryption
- Google – Using advanced search features to find research materials
- Online Anthropometric Data
- Online Forums (such as Stack Overflow) – especially for finding solutions to programming problems
- Research papers – available likely through the internet

What your areas of research will cover?

- Requirements of the target markets

- Flaws of current solutions
- How encryption works and different methods of encryption
- Forms of Biometric Security
- Most suitable microcontroller and programming language
- Most suitable other pieces of hardware (eg the screen)
- Most easy to use, but still effective GUI (Graphical User Interface) for the product
- Most suitable materials – based upon material science principles

Comments and agreement from tutor-assessor

Is the learner taking this project as part of the Diploma? Yes/No

If yes, which Diploma are they taking? _____

Comments (optional):

Is project derived from work which has been/will be submitted for another qualification? Yes/No

Which qualification (title and unit)? _____

Comments (optional):

I confirm that the project is not work which has been or will be submitted for another qualification and is appropriate.

Agreed: (name) (date)

Comments and agreement from project proposal checker

Comments (optional):

I confirm that the project is appropriate.

Agreed: (name) (date)