



Award: *International Diploma in Computer Studies*

Module Title: *Visual Basic*

Assignment Title: *Secret Message*

Examination Cycle: *June 2009*

Candidate Name:

NCC Education

Candidate No:

Submission Date:

Important Notes:

- ❖ Please refer to the Assignment Presentation Requirements for advice on how to set out your assignment. These can be found on the NCC Education *Campus*. Scroll down the left hand side of the screen until you reach Personal Support. Click on this, and then on Policies and Advice. You will find the Assignment Presentation Requirements under the Advice section.
- ❖ You must familiarise yourself with the NCC Education Academic Dishonesty and Plagiarism Policy and ensure that you acknowledge all the sources which you use in your work. The policy is available on *Campus*. Follow the instructions above, but click on Policies rather than Advice.
- ❖ You must complete the '**Statement and Confirmation of Own Work**'. The form is available on the Policies section of *Campus*. Scroll down the left hand side until you reach Personal Support. Click on this and then click on Policies and Advice.
- ❖ Please make a note of the recommended word count. You could lose marks if you write 10% more or less than this.
- ❖ You must submit a paper copy and digital copy (on disk or similarly acceptable medium). Media containing viruses, or media which cannot be run directly, will result in a fail grade being awarded for this module.
- ❖ All electronic media will be checked for plagiarism.

Marker's comments:

Moderator's comments:

Mark:

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Mark:**

**Final
Mark:**

Introduction

The coding of messages to make them secret has reached the heights of mathematical complexity.

Whatever the algorithms for coding and decoding a message, both the sender and receiver must have the same key or keys to the code. A key is usually one or more numbers. If the key is fixed and known to each of the sender and receiver then it is not too difficult to devise a code but the system is inherently insecure. If a key is different for each message then there is the problem of transmitting the code from the sender to the receiver in order that the receiver can decode the message.

A rather crude way of dealing with this problem is to have the key(s) embedded in the message; this assignment will use this approach.

The message is to be embedded in a comparatively large block of random characters.

The first and last 200 characters of the block will not be used for the real message.

The random block of random characters will be generated by a computer before each message is embedded. The random block of characters will contain information as to where the real message is to be inserted in to the block thus:

The real message will be inserted into the block by replacing certain characters of the block.

There will be no spaces or punctuation in the embedded version of the real message.

The position of the **first** character of the real message will be determined by:

$$200 + (\text{the position of the fifth vowel of the first 200 characters of the block}).$$

The **gap** between each character of the real message will be determined by the distance of the third vowel from the end of the last 200 characters in the block.

The last word in the real message will be the two letters corresponding to the ASCII codes given by **first** and **gap**.

Although such a coding method is far from totally secure it would suffice in many normal circumstances and has the advantage that the coding and decoding process could be totally automated by a computer program. As the block of random characters is different for each message then the keys will be different for each message.

This assignment will have the added optional functionality of animating in “slow motion” the coding and decoding process.

At the start of a request from the sender to code a message a suitable size block of random characters will be generated and stored in an appropriate fashion as a text file.

The sender is then asked to enter the real message.

The message is then embedded into the block as indicated above.

The character by character coding process will be displayed on the computer screen.

Once the sender is convinced that the message has been coded the text file will be rewritten with the embedded message.

The contents of the file will then be 'sent' to the receiver (I.E. another VB text file).

The recipient of the message will be simulated using a separate VB form.

The recipient will be notified that a new message has arrived.

The decoding process will then be displayed.

Design and Implementation of the Software

The coding and decoding processes involve comparatively straightforward programming using file handling and string handling. Some thought will be required to decide on the size of the random block of characters.

The 'slow motion' display of the processes will require more complex design and implementation. It would be sensible to allow the viewer of the display to dynamically change the speed of the motion and even to pause the process. One option to generate the display would be to use a DataGridView control exploiting the facility to change the colour of individual cells.

As with the process of sending any message, security must be a consideration. Thus there must be restricted access to the software and as soon as a message has been coded and sent all history of its existence should be removed from the system. In addition the 'slow motion' display must be restricted to authorised eyes only.

The testing of the system will require careful design, it will be necessary to test for normal and extreme situations.

Although the recommended textbook gives adequate coverage of the fundamentals of VB 2005 any particular assignment may require candidates to investigate other aspects of the language by using the Help facility provided by the Integrated Development Environment of VB 2005.

Aim

To produce robust software that meets the requirements detailed in the Introduction.

Task 1 – 10 Marks

Design, implement and test the software to generate and file the random block of characters.

Task 2 – 30 Marks

Design the user interfaces for the sender and recipient.

Include the design of all the algorithms required to:

- Extract the key information from the block
- Achieve the 'slow motion' display
- Implement the security checks.

Task 3 – 35 Marks

Implement and test the designs detailed in Task 2.

Task 4 – 20 Marks

Carry out complete system testing.

Evidence of this system testing must include suitable screen shots.

Task 5 – 5 Marks

Produce a publishable working copy of a compiled version of the completed assignment, together with some installation notes. The installation notes should include the system requirements.

This publishable copy, that includes a setup file, should be on an appropriate medium (zip disk, CD-ROM, DVD etc.).

Guidance

The assessment of your project will to a large extent depend upon the quality of the documentation that you have produced. Thus, for each stage of the development of software:

- Give a detailed design including, where appropriate, the design of any algorithms.
- Build in error handling to involve meaningful messages that would ease any future maintenance of the software.
- Annotate all implementation.
- Design a testing strategy.
- Justify the design of suitable comprehensive test data.
- Show evidence of testing.
- Where appropriate, detail any major remedial action that you have taken in the light of the testing process.

Submission Requirements

A word-processed document incorporating the full documentation of each of the FIVE tasks detailed above. The document should be submitted both in paper form and digital form on a disk.

Refer to the Guidance Notes and assignment presentation requirements when producing your final documentation.

Note the requirement in Task 5 to submit a publishable copy of the compiled system together with a test text file.

Warning: All media must be virus free!

Media containing viruses, or media which cannot be run directly, will result in a FAIL grade being awarded for this module.

You must read and understand NCC Education's policy on 'Academic Dishonesty and Plagiarism'.

You must complete the 'Statement and Confirmation of Own Work' form and attach the completed form to your assignment.