

**OLLSCOIL NA hÉIREANN  
THE NATIONAL UNIVERSITY OF IRELAND  
COLÁISTE NA hOLLSCOILE, CORCAIGH  
UNIVERSITY COLLEGE, CORK**

**2016-2017**

**Semester 2 - Summer 2017**

**CS2511 Usability Engineering**

Dr. H. Purchase  
Prof. C. Sreenan  
Dr. I. Pitt

**Time: 1.5 Hours**

Answer *all* Questions

The use of calculators is permitted

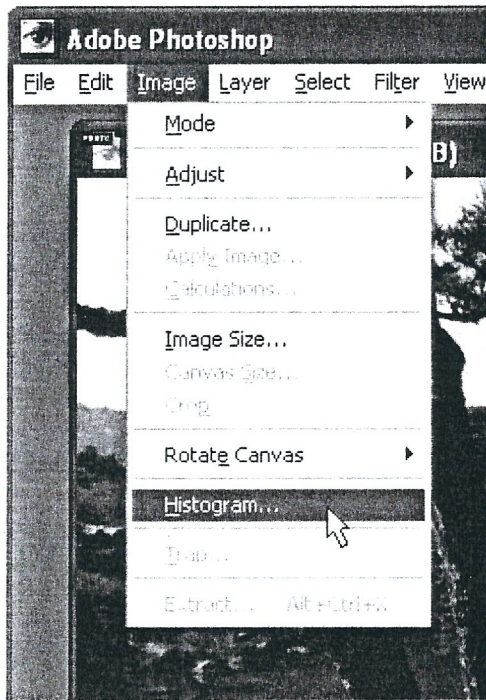
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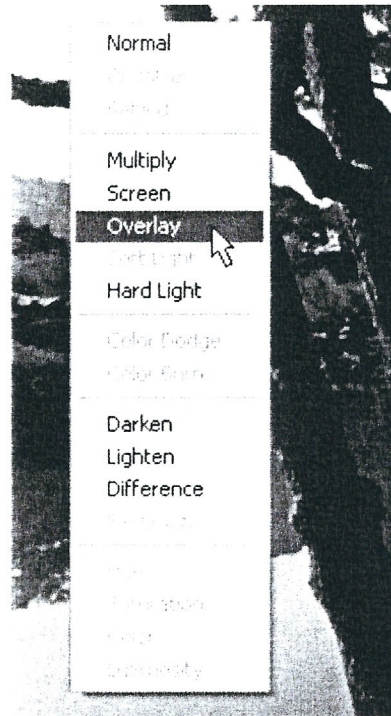
1

- (a) State Fitts' Law, indicating the purpose of each term. Briefly explain the significance of this law.

Shown below are two different types of menu. Comment on the usability of each menu in the light of Fitts' Law.



(1)



(2)

(12 marks)

- (b) Briefly explain the meaning of the following terms:

Sensory Memory

Nominal, Ordinal, Interval and Parametric data

(10 marks)

- (c) The *Optacon* is a device that displays images in tactile form, using a grid of moving pins. It is used by blind people to explore images, printed text, etc..

It has been shown that the Optacon gives best results when used to display dynamic images (e.g., scanning smoothly along a line of text rather than displaying static characters one after the other). Using your knowledge of human haptic perception, explain why this might be.

(8 marks)

2

- (a) Explain the term *Direct Manipulation* as applied to computer interfaces.

List the defining features of Direct Manipulation interfaces, as identified by Shneiderman.

(8 marks)

- (b) The retina of the eye can be divided into several regions, of which the two main ones are the *fovea* and the *periphery*.

Explain how these regions differ in terms of their visual characteristics (visual acuity, light-sensitivity, etc.)

Discuss the implications of these differences for designers of visual/graphical interfaces.

(12 marks)

- (c) Miller (1956) reviewed research-findings on human memory and came to the now-famous conclusion that our short-term memories can hold 'seven plus-or-minus two' items of information.

Discuss the capacity of human short-term memory in the light of Miller's conclusions, and consider the implications of this knowledge for interface designers.

(10 marks)

3

- (a) Briefly explain the meaning of the following terms:

Segmentation

Personas

Normative, Expressed and Felt needs

(9 marks)

- (b) List below are three of Shneiderman's Eight Golden Rules for Interface Design. Explain their significance and, using examples, show how each might be applied in practice.

Design dialogs to yield closure

Offer informative feedback

Cater for universal usability

(9 marks)

- (c) A number of attempts have been made to use 3D sound in interfaces, e.g., to enable blind computer-users to identify the location (direction, distance) of virtual objects. However, it has been found that localisation of sound sources presents more problems than localisation of visual items.

Describe the mechanisms used within the human auditory system to locate the source of a sound. Indicate the strengths and weaknesses of the system, and identify likely sources of error in localisation. Suggest some steps that might be taken to minimise localisation errors.

*(12 marks)*