MARKING GUIDE

HCI – Paper 9 Question 1 (AFB) 2005

A company that sells both spreadsheets and word processors has received complaints from users in the banking industry. The users often copy data from spreadsheets into letters offering special finance terms to individual customers. The default behaviour of the word processor "paste" command is simply to insert the numeric value, whereas a special option (in the "paste special ..." dialog) inserts a recalculating formula. The special option is used so regularly that users have requested an extra item on the pop-up (right click) menu.

(*a*) How would you estimate the increase in operation speed that might result from this change? [6 marks]
ANSWER FROM PAGE 26/27 OF LECTURE NOTES

(*b*) How would you confirm the actual speed increase after constructing a prototype? [4 marks]
ANSWER FROM PAGE 15/16 OF LECTURE NOTES

(*c*) The design team suggest an alternative - that the word processor should be enhanced with sufficient calculation functions that a spreadsheet is not needed at all. What factors should they take into account in order to assess the effect this would have on user tasks? [10 marks]
ANSWER FROM PAGE 30-33 OF LECTURE NOTES

a) (1) MARK FOR IDENTIFYING KLM, (1) FOR APPROPRIATE COMPARISON PROCEDURE, (1) FOR OPERATOR SET, (1) FOR KLM'S OWN DESCRIPTION, (1) FOR CHUNKING OBSERVATION, AND (1) FOR A USEFUL RESULT

b) (1) MARK FOR IDENTIFYING CONTROLLED EXPERIMENTS, (1) FOR SAMPLE PROCEDURE, (1) FOR COMPARISON OF MEANS, (1) FOR SIGNIFICANCE TEST

c) (1) MARK FOR IDENTIFYING USE OF CPs, (1) FOR JUSTIFICATION RELATIVE TO OTHER METHODS
(2) MARKS FOR DESCRIPTION OF TASKS IN SUITABLE ACTIVITY TERMS

FOR EACH DIMENSION NAMED: (1) MARK FOR NAME (1) MARK FOR RELEVANCE TO ACTIVITY, (1) MARK FOR IMPLEMENTATION IN WORD PROCESSOR OR SPREADSHEET
(FULL MARKS EITHER FOR MORE DIMENSIONS, OR FEWER DIMENSIONS MORE FULLY EXPLAINED)

PAPER 9 QUESTION 1 (HCI) – MODEL ANSWER

(A) THE KEYSTROKE LEVEL MODEL COULD BE USED.

TOTAL TIME TO OPEN DIALOG & SELECT ITEM IT FOLLOWS:

M – PREPARE

P_1 – MOVE TO "EDIT" MENU (FROM FITTS' LAW $\approx k \log\left(\frac{\text{DISTANCE}}{\text{TARGET SIZE}}\right)$

K – CLICK

P_2 – MOVE TO "PASTE SPECIAL" (FITTS LAW AGAIN)

R – SYSTEM RESPONSE TO RAISE DIALOG

M – MENTAL PREPARATION (DEPENDS ON CHUNKING MODEL)

P_3 – MOVE TO RECALCULATE OPTION

K – CLICK ON BUTTON

P_4 – MOVE TO DIALOG "OK"

K – CLICK ON BUTTON

COMPARE TO SIMPLE USER:

M – PREPARE

K – RIGHT CLICK

P_5 – SELECT FROM MENU – ASSUME $\cong P_2$

SO SAVING IN TIME = $M + 2K + P_1 + P_3 + P_4$,

PERHAPS AROUND 2 SECONDS. BETTER ESTIMATE COULD BE BASED ON AVERAGE DISTANCE FROM DESK TO MENU IN ORDER TO CALCULATE FITTS' LAW PARAMETERS.

(B) CONTROLLED EXPERIMENT, ASKING A GROUP OF USERS TO CARRY OUT THE SAME TASK USING EACH OF THE ALTERNATIVE INTERFACES (WITHIN SUBJECTS CONDITION)

GET EACH PERSON TO ATTEMPT MULTIPLE TRIALS, AND SAMPLE A RANGE OF USERS. ALSO USE A RANGE OF SAMPLE TASKS/DOCUMENTS.

CALCULATE AVERAGE PERFORMANCE IN EACH CONDITION, DETERMINE WHETHER THE IMPROVED DESIGN SHOWS NEW PERFORMANCE THAT IS SUFFICIENTLY FASTER NOT TO BE THE RESULT OF RANDOM VARIATION BETWEEN SAMPLES (SIGNIFICANCE TEST, DESCRIBED RELATIVE TO STANDARD DEVIATION, IN TERMS OF A P VALUE)

(c) BECAUSE THE POSSIBLE KINDS OF CALCULATION ONE MIGHT WANT TO CARRY OUT VARY SO MUCH, THE BEST APPROACH TO USABILITY EVALUATION WOULD BE ANALYSIS IN TERMS OF THE COGNITIVE DIMENSIONS OF NOTATIONS RATHER THAN FOCUSING ON REPEATED TASKS SUCH AS PUTTING OF A CALCULATED VALUE (WHICH CAN BE ASSESSED USING KLM), COGNITIVE DIMENSIONS FOCUSES ON THE TASKS INVOLVED IN MANIPULATING INFORMATION STRUCTURE.

TYPICAL TASKS MIGHT BE TRANSCRIPTION OF FORMULAE FROM EXISTING DOCUMENTS, AND MODIFICATION WHERE NEW FORMULAE ARE INSERTED. FOR THIS APPLICATION, IT SEEMS UNLIKELY THAT EXPLORATORY DESIGN WOULD BE INVOLVED (~~EXPLORATORY~~ WORK WOULD BE MORE LIKELY FOR THAT)

VISCOSITY IS UNLIKELY TO BE A PROBLEM (IF NO EXPLORATORY DESIGN)

HIDDEN DEPENDENCIES MAY BE A PROBLEM, UNLESS THE PREVIEW MODE SHOWS CLEARLY WHERE DATA HAS COME FROM.

IT IS HARD TO INCLUDE SECONDARY NOTATION IN A WYSIWYG SYSTEM - COULD PERHAPS USE THE COMMENT MECHANISM OF THE WORD PROCESSOR

Computer Science Tripos Part II 2005

Paper 9 Question 1

AFB — Human–Computer Interaction