UNIVERSITY OF TORONTO

FACULTY OF APPLIED SCIENCE AND ENGINEERING

FINAL EXAMINATION, APRIL 2001

MIE449S – HUMAN COMPUTER INTERFACE DESIGN FOR COMPLEX SYSTEMS

Exam Type: X

Examiner - K. J. Vicente

Time: 2 1/2 hours Open book examination. Answer **both** questions. Part A is worth 33 points and Part B is worth 67 points. (100 points total)

PART A:

1. During the semester, two qualitatively different types of methods for deriving interface information requirements were discussed. Task analysis identifies the goals, actions, and decisions that are needed to get the job done. In contrast, work domain analysis provide a multi-level representation of the system that people are responsible for controlling. What are the advantages of each method? What are the disadvantages of each method? (33 points)

PART B:

1. You are a human factors engineer working in a large company that designs human-computer interfaces for medical applications. Your customers are hospitals that are facing significant budget cuts. Your boss is someone who does not have a deep appreciation for human factors. Her primary concern is to get a cheap product out the door as quickly as possible in order to get a large portion of the market share. Your colleagues are engineers whose expertise lies in purely "technical" areas such as computer architecture, instrumentation, signal processing, and computer programming. You are at a critical design meeting where important decisions are going to be made. These decisions will have a significant impact on the functionality and the usability of the product you are designing. You are arguing for following human factors design process and design principles, whereas other members of the design team say the following:

   Other Engineer #1: "Why do we have to worry about all of this human factors stuff? The people who are going to use this interface are highly educated and have a great deal of experience. They will know what to do."

   Other Engineer #2: "I think we should just automate the whole thing so that we don't have to worry about human factors. If all of the functions are automated, then there won't be any human errors because there won't be any humans."

   Other Engineer #3: "I think human factors is really important because accident analyses show that 60% of errors are caused by people in the system. Therefore, what I think we should do is figure out how the job should be done, and then design the interface so that people are required to do the job the right way. This approach will work because it takes all of the thinking out of the job, and therefore reduces the potential for human error."

   Other Engineer #4: "It's too expensive to do things this human factors way. Do you how many lines of code I would have to write to implement the ideas you are talking about? Also, do you know how much time it would take to understand the medical domain to do this task analysis you are talking about? That's why it takes years to get a medical degree!"

   Your Boss: "I think you are right about the importance of human factors to good design. If we don't pay attention to what you are saying, quality and performance may suffer. However, it is better to have people buy our hard-to-use-product and then complain afterwards, than it is to have them buy somebody else's product. If we don't get this product to market right away, then our competitors may beat us to the punch."

   What arguments would you use to try to counter these objections to your views? (67 points)