

OLLSCOIL NA hÉireann
THE NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS 1999

SECOND UNIVERSITY EXAM IN INFORMATION TECHNOLOGY

CT215 ASSEMBLY LANGUAGE PROGRAMMING

Prof. D. Bell
Dr. G. Lyons
Mr. M. Colhoun

Time allowed: Two Hours

Answer question 1 and one other question

All questions carry equal marks

1. A computer is attached to an air conditioning system via two input/output ports, ports 300h and 310h. Reading from port 300h reads a temperature from the air conditioning system. Writing a one (1) to port 310h turns on the air conditioning system while writing a zero (0) to port 310h turns off the air conditioning system.

You are to construct an assembly program to monitor the temperature of the air conditioning system. If the temperature falls below 20h the system should be switched on, if it rises above 24h turned off.

Write a short assembly language routine to continuously check the temperature and act accordingly. Also prepare a state flow diagram to clarify your code.

2. (a) Define opcode, operand. Describe the main components of a computer system internals. Include a list of the most important registers. Explaining the function and importance of each part.
3. Write an assembly language routine to convert an ASCII character from lower to upper case. If the character is non-alphabetic your routine should return the character unchanged.
4. Describe the different addressing modes that can be used in addressing memory locations.
5. Write short notes on each of the following:
 - i. Representing floating point numbers
 - ii. Int 21H
 - iii. Programming the PC Speaker
 - iv. Using the stack to pass parameters to a subroutine