COE 205 Computer Organization & Assembly Language – Fall 2006

Assignment 5: Conditional Processing
Professor: Muhamed Mudawar
Due Date: Saturday, November 25, 2006

Q1. (8 pts) **Message Encryption:** Write an assembly language program that asks the user to enter a message of up to 100 characters and a key that consists of multiple characters (maximum 100). Use this key to encrypt and decrypt the plain-text by XORing each character of the key against a corresponding byte in the message. Repeat the key as many times as necessary until all plain-text bytes are translated. Suppose, for example, the user enters the following input:

```
Enter a message (max 100 chars): This is a plain text message
Enter the key (max 100 chars): AB3X?v78
```

The key repeats until it equals the length of the plain text:

```
T h i s   i s   a   p l a i n   t e x t   m e s s a g e
A B 3 X ? v 7 8 A B 3 X ? v 7 8 A B 3 X ? v 7 8 A B 3 X
```

Your program should then display the encrypted and decrypted message:

```
Encrypted message:
Decrypted message:
```

Your program should be divided into procedures and should be well documented.

Q2. (12 pts) **Test Score Evaluation:** Write an assembly language program that asks the user to enter an array of integer test scores between 0 and 100. Write a procedure to read the array of test scores. Reading should continue until the user enters -1 or until a maximum of 100 test scores are read, whichever comes first. Invalid and out-of-range inputs should be rejected. Write a procedure to sort the array, a procedure to display the sorted array, a procedure to map the test scores onto letter grades from A to F, and to count the number of A's, B's, C's, D's and F's. The A ranges from 90 to 100, B ranges from 80 to 89, C ranges from 70 to 79, D ranges from 60 to 69, and F ranges from 0 to 59. Here is a sample run:

```
Enter test scores from 0 to 100, or -1 to terminate input
Enter a test score: 73
Enter a test score: 95
Enter a test score: 88
Enter a test score: 48
Enter a test score: 105
Out of range -> Rejected
Enter a test score: 91
Enter a test score: -1

Sorted Test Scores: 48 73 88 91 95

A students = 2
B students = 1
C students = 1
D students = 0
F students = 1
```

Documentation and Grading

Make sure to document your code and make it as readable as possible. 2 points on each question will go to documentation and readability, and 2 points will go to the writing of the code, division into procedures, and parameter passing. The rest will go to correctness. Write your name, your id, the date, the objective, the input, and the output at the beginning of each program.

Submitting Programming Assignments

- Submit **the source and executable files** of all programs in **one ZIP file**. A missing executable file will receive 0 on correctness.

- Name it as **A5-yourID.zip**. **All submissions should be made through Email** on the due date by **11 pm**. Send to:

  mudawar@kfupm.edu.sa ; s227524@kfupm.edu.sa

  In the subject field, write your name and ID number.

- Late programming assignments will be accepted, but 1 point will be deducted for each late day for a maximum of 5 late days.

- **A program can be submitted ONCE. Multiple submissions are NOT allowed.** So, make sure to test your program fully using many inputs before submitting it. A small programming error might cost you a lot in program correctness. If your program is not running properly, then consider fixing it and submitting it late by one day losing only 1 point of the grade rather than submitting it incorrectly and loosing many points on correctness.

- **Cheating on programming assignments will NOT be tolerated.** All detected cheating cases will receive zeros, including those students who made the effort and wrote the program. So, make sure that you do NOT give a copy of your program to your friends, because then you might loose your mark.