

COE 205 Computer Organization & Assembly Language – Spring 2008

Programming Assignment 2: Conditional Processing

Due Date: Wednesday, April 30, 2008

- 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:

```
This is a plain text message
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

Document your code and make it as readable as possible. Three marks of each program will go to documentation, readability, and proper use of procedures. The rest will go to correctness. Write your name, your id, the date, the objective of the program, the input, and the output at the beginning of each program. Also make sure to document each procedure properly.

Submitting Programming Assignments

Submit **the source and the executable files** of all programs in one ZIP file. **All submissions should be made through WebCT** on the due date by **11 pm**.

Late programming assignments will be accepted, but 5% of the grade will be deducted for each late day for a maximum of 5 late days.

Note on Academic Honesty

All programs must be done individually and must be **your own work**. Copying a program in whole or in parts is a violation of academic honesty. Also, you must refrain from giving your code to other students, especially if they were your friends. Allowing your friends to copy your program will not help them, but will put you in trouble. Detected copies are given zeros to all involved students including those who did the original work.