ACS Applied Computer Science

THE UNIVERSITY OF WINNIPEG

APPLIED COMPUTER SCIENCE

ACS-2906-001
Computer Architecture and System Software

Fall 2024

Assignment 4

Due date: December 8th, 11:59 pm **Total marks: 20**

Defuse the binary bomb. Each student will be provided a unique executable (A4Q2_x.exe). Each executable will require a password to defuse the bomb. You will need to use the debugger to disassemble the executable, and use traces and memory dumps to find the password. However, the password is also encoded! Therefore, you must not only find where the password is stored in memory, but also decode the password to defuse the bomb.

In a word document, please provide the following information:

- (15 marks) The password of your exercise
- (5 marks) The effective address at which the first character of the password is located. In the debuger, the memory address is in hexadecimal. **Please submit the memory address in decimal (it should be a number between 60 and 90)**.

Hints:

- Before trying to defuse the binary bomb, think about how you would store a password in an assembly program and compare it with user input. This will help you narrow down a set of instructions to look for while tracing through the program.
- You may assume that the password will contain only numbers and / or letters. It will not contain any special characters (!,_,% etc.)
- When debugging a file, remember that to trace the code, you need to use the command 't'
  >T (trace [num]) – execute num instructions and view CPU registers and flags before the instruction starts
- In the debuger, you will need to use the command 'u', which allows viewing the assembly code instructions in the code segment. From there, you might try to figure out where the buffered string input by the user is stored and against which characters (which address) are compared.
  >U (unassemble [num]) – View the assembly code instructions in the code segment with offset address num
- Recall to use the command 'd' to visualize what is in memory and at what address.
  >D (dump [num]) – view contents of data segment from address DS:num

Hand in instructions

Include your name and student number in all files. Submit a word document with the password (15 points) and the memory address (5 points). **Up to 5 marks will be deducted for students who do not follow instructions or submit poorly formatted work**. Submit your submission through Nexus.