Assignment 1

**1.1.3**

1. An assembler is used to convert a program that is inputted as assembly language so that it can be  
 changed into machine language so the machine can understand it. The linker is a program that  
 combines individual object modules into one singly executable program. Together each program has  
 to work together to execute a program.

3. High level languages can have one line of code carry out multiple functions at a time; this is known as  
 one-to-many relationship. In machine language one line of code can only carry out one task; this is  
 known as one-to-one relationship.

8. Type checking is stricter in assembly because of all the potential room for error; the programmer  
 needs to be specific when requesting it.

12. x = (y\*4) + 3  
 mov eax, Y

mov ebx, 4

imul ebx

add eax, 3

mov X, eax

**1.2.1**

2. Translated programs are executed more quickly that interpreted ones usually because the language of  
 the program is usually changed into a machine language or a language easier for the machine it is  
 being run on. In interpretation source code has to be translated at the same time as its being  
 executed which slows the process down.

3. True

10. Instruction Set Architecture (ISA)

**1.3.9**

2. Binary to Decimal  
 a) 11111000 = 128+64+32+16+8 = 248  
 b) 11001010 = 128+64+8+2 = 202  
 c) 11110000 = 128+64+32+16 = 240

3. Sum of Binary  
 a) 00001111 + 00000010 = 00010001  
 b) 11010101 + 01101011 = 101000000  
 c) 00001111 + 00001111 = 00011110

5. How many binary bits?  
 a) 65 = 7  
 b) 409 = 9  
 c) 16385 = 15

6. Binary to Hexadecimal  
 a) 0011 0101 1101 1010 = 3 5 13 10 = 35DA  
 b) 1100 1110 1010 0011 = 12 14 10 3 = CEA3  
 c) 1111 1110 1101 1011 = 15 14 13 11 = FEDB

7. Hexadecimal to Binary  
 a) A4693FBC = 10 4 6 9 3 15 11 12 = 1010 0100 0110 1001 0011 1111 1011 1100  
 b) B697C7A1 = 11 6 9 7 12 7 10 1 = 1011 0110 1001 0111 1100 0111 1010 0001  
 c) 2B3D9461 = 2 11 3 13 9 4 6 1= 0010 1011 0011 1101 1001 0100 0110 0001

**1.7.1**

1. The bit that is on the furthest left is the most significant.

2. Decimal Representation  
 a) 00110101 = 53  
 b) 10010110 = 150  
 c) 11001100 = 204

3. Sum of Binary Numbers  
 a) 10101111 + 11011011 = 110001010  
 b) 10010111 + 11111111 = 110010110  
 c) 01110101 + 10101100 = 1000100001

4. 00001101 – 00000111 = 00000110

5. # of bits   
 a) word = 2\*8 = 16 bits  
 b) doubleword = 4\*8 = 32 bits  
 c) quadword = 8\*8 = 64 bits  
 d) double quadword = 16\*8 = 128 bits

6. Minimum # of bits needed  
 a) 4095 = 0000111111111111 = 12 bits  
 b) 65534 = 1111111111111110 = 16 bits  
 c) 42319 = 1010010101001111 = 16 bits

7. Hexcadecimal representation  
 a) 0011 0101 1101 1010 = 3 5 13 10 = 35DA  
 b) 1100 1110 1010 0011 = 12 14 10 3 = CEA3  
 c) 1111 1110 1101 1011 = 15 14 13 11 = FEDB

8. Hexadecimal to Binary  
 a) 0126F9D4 = 0 1 2 6 15 9 13 4 = 0000 0001 0010 0110 1111 1001 1101 0100  
 b) 6ACDFA95 = 6 10 12 13 15 10 9 5 = 0110 1010 1100 1101 1111 1010 1001 0101  
 c) F69BDC2A = 15 6 9 11 13 12 2 10 = 1111 0110 1001 1011 1101 1100 0010 1010

9. Hexadecimal to Decimal  
 a) 3A = (3\*16) + (10\*1) = 58  
 b) 1BF = (1\*16^2) + (11\*16) + (15\*1) = 447  
 c) 1001 = (1\*16^3) + (0\*16^2) + (0\*16) + (1\*16^0) = 4097

10. Hexadecimal to Decimal  
 a) 62 = (6\*16) + (2\*1) = 98  
 b) 4B3 = (4\*256) + (11\*16) + (3\*1) = 1203  
 c) 29F = (2\*256) + (9\*16) + (15\*1) = 671  
11. Signed Decimal to 16-bIt Hexadecimal  
 a) -24 = FFE8  
 b) -331 = FEB5

12. Signed Decimal to 16-bit Hexadecimal  
 a) -21 = EA  
 b) -45 = D2

13. 16-bit Hexadecimal to Decimal  
 a) 6BF9 = 27641  
 b) C123 = -16093

14. 16-bit Hexadecimal to Decimal  
 a) 4CD2 = 19666  
 b) 8230 = -32208

15. Binary to Decimal  
 a) 10110101 = -75  
 b) 00101010 = 42  
 c) 11110000 = -16

16. Binary to Decimal  
 a) 1000000 = -128  
 b) 11001100 = -52  
 c) 10110111 = -73

17. Decimal to 8-bit Binary  
 a) -5 = 1111011  
 b) -42 = 11010110  
 c) -16 = 11110000

18. Decimal to 8-bit Binary  
 a) -72 = 10111000  
 b) -98 = 10011110  
 c) -26 = 11100110

19. Sum of Hexadecimal   
 a) 6B4 + 3FE = 101010110010 = AB2  
 b) A49 + 6BD = 0001 0001 0000 0110 = 1106

20. Sum of Hexadecimal   
 a) 7C4 + 3BE = 1011 1000 0010 = B82  
 b) B69 + 7AD = 0001 0011 0001 0110 = 1316

21. Hexadecimal and Decimal: B  
 Hexadecimal = 42h  
 Binary = 66b

22. Hexadecimal and Decimal: G  
 Hexadecimal = 47h  
 Binary = 72b

25.

|  |  |  |  |
| --- | --- | --- | --- |
| A | B |  |  |
| F | F | F | T |
| F | T | T | F |
| T | F | T | F |
| T | T | T | F |

**1.7.2**

.data

value1 DWORD 124

string1 BYTE?

.code

main PROC

mov eax, value1

call MyFunction

exit

main ENDP

MyFunction PROC

mov esi, 0

Loop1:

Div2

mov str[esi], edx

inc esi

cmp eax, 0

je End

LOOP Loop1

Loop2:

inc esi

dec edi

LOOP Loop2

REV:

mov esi, 0

mov edi, (LENGTHOF string1) – 1

mov ecx, (LENGTHOF string1) / 2

ret

MyFunction ENDP

END