Assembly 3 Project

Due on August 11th, 2019
Computer Organization & Programming
CS550WS—Summer I
Ed Banduk

Daniel Kadyrov

Problem 1. Write and compile the Assembly program code: "Reading a Text File with 68K Assembly"

Solution

```
    ORG    $1000
START:
        lea     filename, a1
        move    #51, d0
        trap    #15
        move.l  #filesize,d2

        lea     buffer, a1
        move    #53, d0
        trap    #15
        move    #5,d3

convert_loop:
    tst.b   d3
    beq     done
    sub.b   #$30, (a1)+
    sub.b   #1, d3
    bra     convert_loop

done:
    SIMHALT

    org     $2000

filename    dc.b    'text.txt',0
buffer      ds.b    80
filesize    dc.b    80

    END    START
```

Problem 2. Please explain how to transform an assembly language program into a binary executable file using basic reference tables.

Solution

Assembly is a low-level programming language that uses an assembler program to convert the mnemonic written code to a machine readable, binary, executable file. The assembler uses a reference table to look up the binary counterparts of the programmed instruction. This reference table is known as the operation code, or opcode. As the assembler parses through the program from top to bottom, the compiler combines these opcodes with the registers specified in the assembly to generate a binary output file.

Englander, I. (2014). *The architecture of computer hardware, systems software, & networking: An information technology approach* (Fifth ed.). Hoboken, NJ: John Wiley & Sons.

Problem 3. Please explain the formats of the different types of data (image, video, audio and alphanumerical, integers, floating point numbers).

Solution

Data is anything is stored digitally as bits and bytes, however they are stored differently based on the type. Images are generally stored as bitmaps, or raster images, which are a series of pixels asigned a color and arranged in a pattern. Videos are a series of images, or bitmaps, stored with a certain framerate. Audio is stored as a series of integers at a certain sampling rate, that corresponds to the quality of the recording. Alphanumerical data is stored in binary with low storage requirements and utilizing look up tables like ASCII, EBCDIC, and Unicode to translate into the human readable format. Integers are easily represented and converted in binary. Floating point numbers are stored using four-bytes which use a mantissa, a representation of the significant digits, and exponents.

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