

Assembly 3 Project

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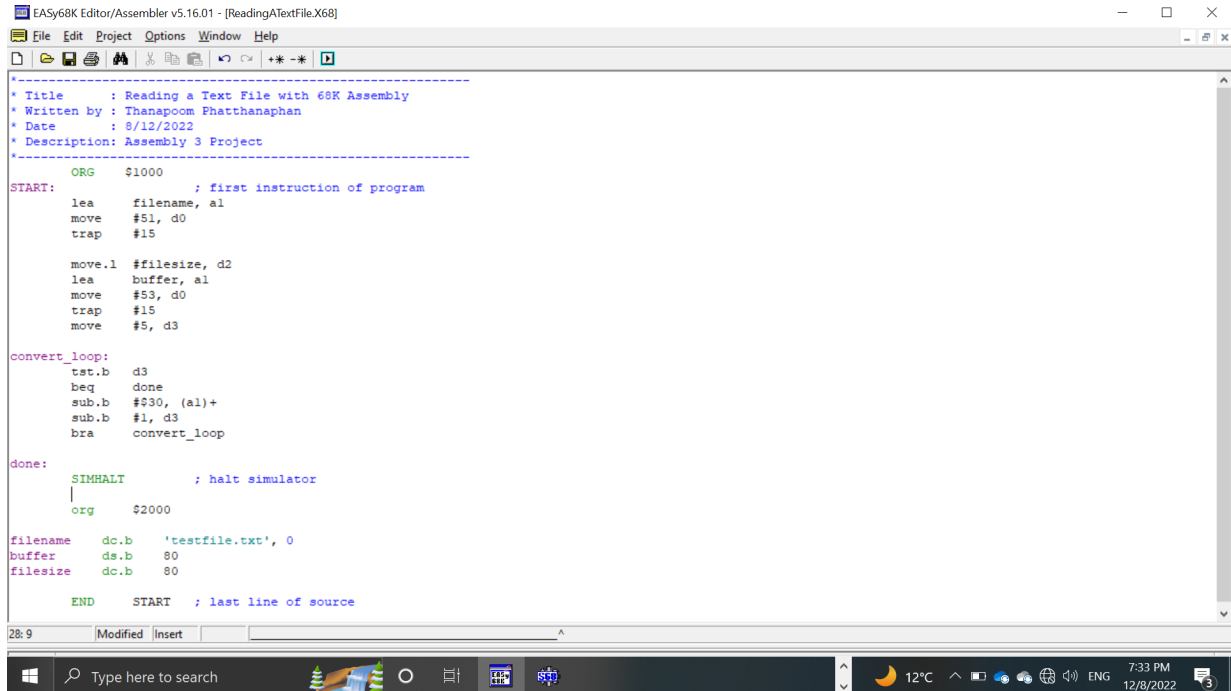
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CS 550: Computer Organization and Programming

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Program Code: "Reading a Text File with 68K Assembly" (Maximum 3 points) Please review the posted on Canvas training videos, write and compile the program Assembly code "Reading a Text File with 68K Assembly" by using the Notepad.



The screenshot shows the EASy68K Editor/Assembler v5.16.01 interface. The title bar indicates the file being edited is [ReadingATextFile.X68]. The menu bar includes File, Edit, Project, Options, Window, and Help. The toolbar contains various icons for file operations and editing. The main text area displays the following assembly code:

```
*-----*
* Title       : Reading a Text File with 68K Assembly
* Written by  : Thanapoom Phatthanaphan
* Date       : 8/12/2022
* Description : Assembly 3 Project
*-----*

ORG      $1000

START:   ; first instruction of program
        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 ; halt simulator
        org     $2000

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

END      START ; last line of source
```

The status bar at the bottom shows the current line is 28:9, with 'Modified' and 'Insert' modes. The Windows taskbar at the bottom displays the search bar, taskbar icons, system clock (7:33 PM, 12/8/2022), and temperature (12°C).

Please explain how to transform an assembly language program into a binary executable file using the necessary reference tables.

An assembly language is a low-level programming language that is intended to communicate directly with a computer's hardware. Assembly languages are designed to be readable by humans to make it easier for programming because it is very difficult for humans to understand and write a code in machine language which consists of binary and hexadecimal characters. Assembly language can be converted to machine language using an assembler. There are two types of assemblers. The first type of assembler is a single-pass assembler which works by scanning the assembly language only one time then creates an equivalent binary executable file. The second type of assembler is a multi-pass assembler which works more than one pass to convert assembly language to machine language. A multi-pass assembler creates a table with every symbol and each of their values in the first pass, then use the table in future passes to generate new code. Each separate pass usually handles a different specific task. Though usually slower, multi-pass assemblers with modular structures can often be reused for different machines.

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

1. Image

1.1 TIFF (Tagged Image File Format): This format uses a lot of memory space because images are uncompressed and contain a lot of detailed image data. This makes the file size is very large. However, this TIFFs are flexible in terms of color.

1.2 JPEG (Joint Photographic Experts Group): This format creates small size of images because images are compressed but some of the image detail are lost.

1.3 GIF (Graphic Interchange Format): This format compresses pictures but not as same as JPEG because images detail are lossless. Thus, the size of the images are small but still bigger than JPEG.

1.4 PNG (Portable Network Graphics): This format is an open format to replace GIF. It allows for a full range of color and better compression compared to GIF.

2. Video

2.1 FLV (Flash Video Format): This format is encoded by Adobe Flash software which can be played via Adobe Flash Player, web browser plugins and some third party programs.

2.2 AVI (Audio Video Interleave): This format stores data to be encoded in different codec's that contains both video and audio data. AVI supports many operation systems such as Windows, Macintosh and Linux.

2.3 MP4 (Moving Pictures Expert Group 4): This format is used in storing visual and audio streams online. The video is compressed using the MPEG-4 video encoding. This format supports both mobile and online browsers.

3. Audio

3.1 .MOD file is mainly used to store samples of sound that will be used to produce a new sound. For example, producing a new sound from a sample of a piano tone.

3.2 MIDI format is used to coordinate the sounds and signals between a computer and connected musical instruments, specifically keyboard.

3.3 .VOC format can be used to repeat (loop) a block or synchronize the different components of a multimedia presentation.

3.4 .WAV format is mainly used to store and reproduce snippets of sound. This format does not compress the file, thus the file size is large.

4. Alphanumeric

Alphanumeric data must be stored and processed within the computer in binary form, each character must be translated to a corresponding binary code representation as it enters the computer. The common three alphanumeric codes are Unicode, ASCII (American Standard Code for Information Interchange), and EBCDIC (Extended Binary Coded Decimal Interchange Code) .

5. Integers

Integers are positive or negative whole numbers. The string of characters representing a number is converted internally by a conversion routine built into the program by the compiler and stored and manipulated as a numerical value.

6. Floating-point numbers

Floating-point numbers are numbers with a decimal portion, or numbers whose magnitude, either small or large, exceeds the capability of the computer to process and store as an integer. Again, the routine to convert a string of characters into a real number is built into the program.

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