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

Assembly is a low-level language that requires an assembler to convert the written code into a binary executable file which can be understood by the computer to follow the instructions. Compiler is used to convert the human readable language into something that machine can understand. For assembly an assembler is used as a compiler to convert the assembly code into a binary executable. An assembler works from top to bottom in as equivalent manner executing the instructions specified by the programmer. The operation stable which is used to determine the type of instruction, the number of operands, and other information that is required to translate the instruction.

The operations table is built right into the assembler. There is also a symbol table which is specific to a particular program, and it is used during the final translation to look up any symbols that are not located in the operations table.

***Assembly language - Wikipedia.*** (n.d.). Retrieved November 22, 2021, from <https://en.wikipedia.org/wiki/Assembly_language>.

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

Image:

Images come in many different shapes, sizes, textures, colors, and shading. Images are formatted according to processing, display, application, and storage requirements.

Image formats are divided into 2 main categories:

* Continuous or Bit Map Images or Raster Images
* Geometric or Object Images or Vector Images

 Common standards include:

* GIF (Graphics Interchange Format) most common and the fact standard
* TIFF (Tagged Image File Format)
* PCX (PC Paintbrush)
* Windows Bitmap
* BMP
* PNG

Video:

Video representation is time sensitive, which means the longer the video clip, the higher the storage requirements.

Storage Requirement = number of pixels in the image X number of color bytes X refresh rate X video length.

Audio:

Audio must be converted to digital format for storage and processing

* MOD store samples of sounds that can be manipulated to produce new sounds
* MIDI used to coordinate sounds and signals with connected musical instruments
* VOC general format with repeat and synchronize features (multimedia presentations)
* WAV general purpose format used to store and reproduce sound
* MP3

Alphanumerical:

Alphanumeric, also referred to as alphameric, is a term that encompasses all of the letters and numerals in a given language set. In layouts designed for English language users, alphanumeric characters are those comprised of the combined set of the 26 alphabetic characters, A to Z, and the 10 Arabic numerals, 0 to 9.

Integers:

In computer science, an integer is a datum of integral data type, a data type that represents some range of mathematical integers. Integral data types may be of different sizes and may or may not be allowed to contain negative values. Integers are commonly represented in a computer as a group of binary digits (bits). The size of the grouping varies so the set of integer sizes available varies between different types of computers. Computer hardware, including virtual machines, nearly always provide a way to represent a processor register or memory address as an integer.

floating point numbers:

There are several mechanisms by which strings of digits can represent numbers. In common mathematical notation, the digit string can be of any length, and the location of the radix point is indicated by placing an explicit "point" character (dot or comma) there. If the radix point is not specified, then the string implicitly represents an integer and the unstated radix point would be off the right-hand end of the string, next to the least significant digit. In fixed-point systems, a position in the string is specified for the radix point. So a fixed-point scheme might be to use a string of 8 decimal digits with the decimal point in the middle, whereby "00012345" would represent 0001.2345.

Englander, I. *Architecture of computer hardware, systems software, and networking: An information technology approach* (5th ed.). John Wiley.