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COMPARATIVE ANALYSIS OF MACHINE, ASSEMBLY AND HIGH-LEVEL LANGUAGES

Machine language is the language native to the computer system and therefore does not require a program translator to run. It is easy for the computer to understand and therefore difficult for humans to understand, to debug and maintain. It is not easy to learn and it is also machine dependent.

Assembly Language is an improvement made over machine language. It is easier to understand than machine language but still not easy overall. It requires the use of a program translator called the assembler in order for the computer to understand. It is difficult to learn, write and to debug. It is also machine dependent

High-level languages are another improvement over machine language and over assembly language as well. Although there are several paradigms and sub-categories within these languages. It is relatively easier to learn, write and debug. A lot of high-level languages are not machine dependent e.g. Java, C++, C, BCPL, python, etc.

IN TABULAR FORMAT:

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| **POINTS/ LANGUAGES** | **MACHINE LANGUAGE** | **ASSEMBLY LANGUAGE** | **HIGH-LEVEL LANGUAGE** |
| Program translators | It is easily understood by the computer system and does not need a program translator | It makes use of a program translator called the Assembler | It makes use of program translators: usually , interpreters and compilers |
| understandability | Machine language is written in 0s and 1s and it is not easy for humans to understand | It is easier to understand than machine language due to the use of mnemonics but still not so easy to understand overall | It is the easiest of the three to understand because most high-level languages use some sorts of natural languages in their syntax |
| Learnability | It is not easy to learn | Easier to learn than machine language but still has difficulties | It is easier to learn |
| Debug | It is difficult to debug | It is difficult to debug | It is easier to debug |
| Machine dependence | It is machine dependent | It is machine dependent | Most are machine independent |