

Advancements in Computer Programming and Emerging Gaps in Regards to Engineering Problem Solutions and Education

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Since Charles Babbage's *Analytical Engine*, inventors and researchers have been attempting to make advancements in computing technologies, resulting in the birth of the Computer Science (CS) discipline in the 1940s. Since then research work has been conducted and advancements made in different branches of Computer Science, namely programming language (PL), software engineering, database and information retrieval systems, artificial intelligence and robotics. All these advancements have enabled our day to day activities to become easier, more efficient, faster and more accurate. Moreover, PLs have helped tremendously to accelerate developments and advancements in other fields such as Applied Mathematics, Statistics, Physics and Engineering. The development of CAD (Computer Aided Design) and CAM (Computer Aided Manufacturing) systems especially, are providing enormous assistance to engineers in their designing and modelling tasks. Many complex problems of engineering and applied mathematics are being effectively solved through the use of different PLs. The journey of programming languages started with COBOL; and then progressed with BASIC, FORTRAN, Pascal, C, C++ and Delphi. Many specialized engineering softwares were developed using

these languages. To keep up-to-date with the race, many engineering students were required to learn some of these programming languages to support their research and complex problem solving. However, as we have come to expect, Computer Scientists continued to update, introducing new programming languages such as Visual Basic, Java, C#, Python etc. and most recently focusing on 4th generation PLs. Engineering students are unable to keep up with the rate of progress, as this is not the main focus of engineering education. Moreover, for most complex computational problems faced by engineers, FORTRAN, C++ and similar languages are more than adequate. On the other hand, the introduction of and advancements in Spreadsheet tools have replaced the need to use PLs, even at some intermediate levels of engineering problem solving and research. Many engineers do not need to learn or use any PLs. Based on this engineering, academic institutions are either withdrawing from teaching PL, or holding back upgrading to and teaching the new generation PLs. As a result, a knowledge gap is emerging that is likely to grow. In the past, engineers and programmers were able to efficiently collaborate with each other on common goals. This collaboration is likely to be hampered due to the widening of this knowledge gap.

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