HINTS ON PROGRAMMING LANGUAGE DESIGN

Link: http://i.stanford.edu/pub/cstr/reports/cs/tr/73/403/CS-TR-73-403.pdf

What are the problems/research questions addressed by this article?
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He presents the view that a programming language is a tool which should assist the programmer in the most difficult aspects of his art, namely program design, documentation, and debugging. It discusses the objective criteria for evaluating a language design, and illustrates them by application to language features of both high level languages and machine code programming. It concludes with an annotated reading list, recommended for all intending language designers.

What are the existing solutions for this research question/problem?
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He first isolated the most difficult aspects of the programmer's task, and stated in general terms how a programming language design can assist in meeting these difficulties.
He discussed a number of goals which have been followed in the past by language designers, and which he regard as comparatively irrelevant or even illusory.
He then turn to particular aspects of familiar high level programming languages,
and explain why they are in some respects much better than machine code programming, and in certain cases worse.

Future work:

Among the most trivial but tiresome errors of low level programming
are type errors, for example, using a fixed point operation to add floating 23 point numbers, using an address as an integer or vice versa, or forgetting c L L the position of a field in a data structure. The effects of such errors, although fully explicable in terms of bit patterns and machine operations, are so totally unrelated to the concepts in terms of which the programmer . .is thinking that the detection and correction of such errors can be exceptionally tedious. The trouble is that the hardware of the computer is far too tolerant and forgiving. It is willing to accept almost any sequence of instructions and make sense of them at its own level. That is the secret of the power, flexibility, and simplicity, and even reliability of czsnputer hardware, and should therefore be cherished.