

prints 02 cards and writes 01 cards to magnetic tape. The statements

```
IF DESIG = 01 GO TO TPROC.  
...  
TPROC  
MOVE CARD-IN TO CARD-OUT.  
WRITE CARD-OUT.
```

where CARD-IN is the data record defined for an 01 card and CARD-OUT is the data record defined for the tape file, enable us to make the statement

$$\forall(a_1) PI_1 \Rightarrow J_1(b_1)$$

where a_1 are cards designated 01, I_1 is a string of 01 cards and $J_1(b_1)$ is a string of card images on magnetic tape. Similarly the statements

```
IF DESIG = 01 GO TO TPROC.  
MOVE CARD-IN TO P-OUT.  
WRITE P-OUT.
```

References

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Correspondence

To the Editor
The Computer Journal
Sir

The wonderland of operating systems

The pricking by Professor Barron and others of the bubble of intellectually lazy operating systems may well be seen in future years as a turning point in computer usage. The letters by B. L. Meek and P. R. Walwyn (this *Journal*, Vol. 14, No. 4) combine in pointing to the moral that the following are good discipline in comparison with their negations:

In punched cellulose-pulp input media; paper tape.
In algorithmic languages; ALGOL.
In computers; little ones.

There is perhaps no more reason why anyone should be turned loose on a computer in the multi-million cost range before demonstrating his competence on 8K of store and no backing, than there is for someone to drive an F1 car before being qualified to remove his L-plates.

Yours faithfully,
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where CARD-IN is the data record defined for an 02 card and P-OUT is the data field defined for the print field, enable us to make the statement

$$\forall(a_2) PI_2 \Rightarrow J_2(b_2),$$

where a_2 are cards designated 02, I_2 is a string of 02 cards and $J_2(b_2)$ is a printed list of card images. In this way we can build up a specification of what the program will do; however, if CARD-IN is also a data record for an 04 card, then 04 cards will be treated in the same way and the program will be incorrect, as our original statement says nothing of such cards. Furthermore, we are quite unable to make any statement relating to cards whose records are not defined in the data division.

In conclusion, although we can determine what a program will do on defined input, we cannot determine what it will do on undefined input.

Acknowledgement

The author acknowledges the valuable comments of the referee on the first draft of this paper.

To the Editor
The Computer Journal
Sir

There is a small error in the paper by B. Randell, Ludgate's Analytical Machine of 1909 (*The Computer Journal*, Vol. 14, No. 3, August 1971). On page 317 Professor Randell states 'Charles Babbage died in 1872, . . .'. This should have read 1871. I quote from *The Times* (London, Saturday, 21 October, 1871) under the heading 'Deaths'.

'On the 18th Oct., at 1, Dorset-street Manchester Square, Charles Babbage, Esq., in the 80th year of his age'
I mention this rather trivial error just to keep the record straight.

Yours faithfully,
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26 October 1971

Professor Randell replies:

I thank Professor Williams for his note regarding the error in my Ludgate paper concerning the date of Babbage's death.

I had, in fact, noticed this error as soon as I received the printed version of the paper. However, in view of the considerable publicity about Babbage in this the centennial year of his death, I would not expect the error to cause much confusion to others, but merely embarrassment to me.