

CERN Courier Archive: 1970

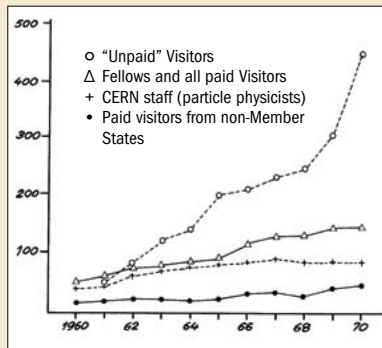
A LOOK BACK TO CERN COURIER VOL. 8, OCTOBER 1970, COMPILED BY PEGGIE RIMMER

CERN

Fellows and Visitors

It is not always realized that the major part of CERN's research programme is carried out by Fellows and Visitors. This summer their number was about 700 while staff members who are theoretical or experimental particle physicists numbered about 90. They come from 108 Universities and Research Institutes in CERN Member States and 72 in non-Member States. Most Visitors are "unpaid" (by CERN); financial support comes from their parent University.

In view of the importance of Fellows and Visitors for the research effort of the Laboratory and of Universities and Research Institutes in so many countries, a paper was prepared which reviewed the evolution of the programme since 1960 and made proposals for the years up to 1975; it was approved



by Council in June. The proposals imply an increase of 30 to 50% in Fellows and Visitors from Member States. Expenditure

Evolution of (some) CERN personnel 1960–1970. Participation in electronic experiments at the Proton Synchrotron explains the recent marked increase in unpaid visitors.

on Visitors from non-Member States will remain at about 1% of the total personnel budget each year.

Also, during the summer months, about a hundred University students (not included in the figure) come to CERN. They participate in the day-to-day work of research or technical groups and attend a special course of lectures.

● Compiled from texts on pp314–315.

COMPUTING

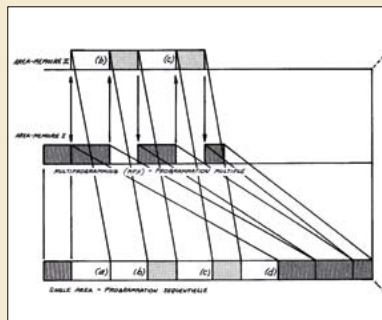
Multiprogramming on PS computer

The present capacity of the IBM 1800 computer controlling the PS would be greatly exceeded when the Booster is brought into operation, so a multiprogramming job-distribution system has been adopted to reduce "dead time" in the central processing unit, CPU.

A computer normally uses two kinds of memories. Internal memories (core or ferrite) are fairly expensive and generally installed in quantities that can store only small amounts of data. Their advantage is a very short access time, of the order of a microsecond. Cheaper auxiliary memories (disc or tape) are used to store large quantities of data; these cannot be transmitted as rapidly to the CPU.

Programs which the CPU needs often must be constantly available in "fixed core" ferrite memory. Others can be stored on discs and transferred, when needed, to reserved parts of "variable core" ferrite memory, taking from 50 ms to a few seconds.

Up to now time-sharing has been used, each program being processed in sequence according to its allocated priority. A higher priority program can interrupt one of lower priority, which returns to the disc until the higher priority one finishes. If a running program requires further data and there is a long waiting time (a frequent occurrence at the PS where data come from several

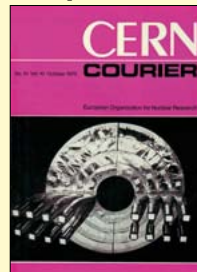


Operating time of the central processing unit in a computer. The bottom line shows time-sharing, where a program (dark blocks) is interrupted by a higher priority one (paler). Block (a) represents the time taken transferring to the disc store, (b) bringing in the higher priority program, (c) calling for more data and (d) returning the first program. In the top lines, multiprogramming illustrates time saving by shuffling between programs.

machine cycles), it is possible to pass on to another program. However, this transfer can become complex and has not been used. The loss of time has been accepted and effective CPU time is a small fraction of the total time.

Multiprogramming uses several distinct variable cores. At the PS, there will be one for each of the three machine sections – linac, booster and synchrotron ring. Transition from one to another is very fast

Compiler's Note



Anyone queuing for lunch at CERN these days cannot fail to notice the preponderance of young people. Research physicists on the CERN staff still number a modest 80 or so but

there are now around 540 fellows, plus some 400 technical and administrative students and "stagiaires" (trainees). CERN summer students swell the numbers for two or three months in the sunny season, 143 from member states and 133 from non-member states this year.

A most encouraging sign for the future, making it worth waiting in line!

and it is possible to deal with a part of one program, then a second, then a third or a fourth, to use up dead time. Efficiency close to 50% should be possible, compared with the former rate of about 10%.

Multiprogramming requires increasing the number of "fixed cores" from 16 to 20 K words, and "variable cores" from 8 to 20 K words. This will quadruple the capacity for only 25% of the cost of the computer.

● Compiled from texts on pp275–276.