

All that has been done to date is to allocate groups of jobs to sections of men and machines, and leave it to the foreman to do the detailed job allocation. The computer is then working on average job times and changeover times between jobs. This is probably adequate in many machine shops where such things as the changeover time between jobs is fairly constant for any pair of jobs or is small compared with the job-time. The simplified scheme is probably also adequate where job-times are fairly short compared with shift-time, and where there is not much loss in starting and stopping. However, if these conditions do not apply, there may be considerable loss in splitting the whole job into separate sections without interaction. If the problem is too big to be planned by a small group of men who can work closely together, it must be broken down into more or less independent sub-problems each of which is planned by a small group. This causes loss of flexibility and efficiency—just as on a large timetable one would lose flexibility by not being able to see the table as a whole.

The school timetable problem is in some ways easier and in others much harder than factory scheduling. It is easier because all the periods are of the same length or simple multiples of this length. School timetables are, however, made vastly more difficult by the fact that most classes are occupied for every period of the week. Masters have some free periods and may have a utilization of 85%. In factory scheduling this would be equivalent to a machine loading of 85% and a man utilization

of 100%—the difficulty rises swiftly as one approaches 100%.

Air traffic control

There are many similarities between the way in which we have chosen to tackle the school timetable problem and a class of problem which includes road, rail, and air traffic control. We could imagine the entry line to be analogous to an aircraft wanting to enter the control area. Various possible flight paths can be allocated to it for periods of time into the future, and these obey similar rules for clashing. Before it can be accepted it has to be allocated to a group which has some freedom (i.e. its $P - N$ or equivalent term must be positive non-zero). The combination of flight paths allocated represents the timetable. There are, of course, differences—we are dealing with a continuously varying timetable of the factory scheduling type rather than the cyclic one of the school timetable.

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Work of 'New Generation' to be shown at London Computer Exhibition and Symposium

Electronic Computer Exhibition: Olympia, London, 3–12 October 1961

Business Computer Symposium: 4, 5, and 6 October 1961.

“The Work of the New Generation of Computers” will be the theme of the Electronic Computer Exhibition to be held at Olympia, London, from 3 to 12 October 1961. Emphasis will be placed at least as strongly on new applications as on new equipment.

At the same time the Business Computer Symposium, to be held at Olympia on 4, 5, and 6 October, will bring forward users from some of the largest and smallest firms in Britain to speak of their experience with computers and to exchange information. Plans are being made to reach out especially to the businessman who is currently faced with the decision to instal electronic data processing equipment. The exhibition will aim to talk to him in management terms.

Display boards on the stands will feature statements from directors of user companies underlining the value of a computer to their business. In order to widen the range of experience placed at their disposal, those attending the exhibition will be able to arrange, on exhibitors' stands, visits to computer system installations of particular interest to them—to take place after the exhibition.

The exhibition and symposium will be organized jointly by the Electronic Engineering Association and by the Office Appliance and Business Equipment Trade Association which will organize the Business Efficiency Exhibition to run concurrently at Olympia. A list of some 40 exhibitors is divided almost equally between manufacturers of computers and firms concerned with ancillary equipment.

Further particulars about exhibits and papers will be published in *The Computer Bulletin*, Vol. 5, Nos. 1 and 2.