

EFFECTIVENESS OF MIND SCHEDULING AND GROUP SCHEDULING IN OPTIMISATION

Abstract : The example of best machine in universe is human mind. Human mind follows all the instructions given accurately. Hence there is correlation between human mind and scheduling. Scheduling helps for proper channelization of problems. Actually arrangement of steps can be done in two ways- sequencing and scheduling. There are various techniques which plays an important role in foundation of mind scheduling of learner. First we have to select the actual step which is important in starting of the work and then following the next steps in proper order for completion of the work in minimum time. Schedule gives us the idea of our planned work or task and how much time will required for its completion. By using the various methods of traditional education and philosophy we can set the mind of learner in such a way that he can use these techniques for getting the maximum output. The first part of this paper emphasized on skills of mind scheduling and second part includes the scheduling of grouping of jobs to get maximum output.

Key words : machine scheduling, mind scheduling, yoga, grouping of jobs.

INTRODUCTION

Scheduling means planning of the activities involved in work. It is the branch of Operational Research. The terms sequencing and scheduling are related with each other. For effective scheduling there is need of mind scheduling which helps to achieve our ideal target in minimum time successfully. In industries every scheduling contains the tasks to be performed and the raw material available for it. In machine scheduling, machines are arranged in series and parallel. In our real life also the problems are exactly related with these two types. The time required for completion of any work in day to day life can be considered as unknown variable.

Concept of Mind scheduling-

Now days most of the companies and organizations are focusing on web based mind-body scheduling and management. It is beneficial and gives remarkable output

to the company. Every company wants to manufacture their product as early as possible by using the available restricted resources effectively. If the available resources used in proper ways and in time then we can avoid the lateness of completion of job. The set up time, weighting time, transportation time and completion time of each job on each machine is different and these all are unknown before actual processing. Hence for the planning of unique or appropriate schedule there is need of mind scheduling.

Scheduling involves three types- flow shop, open shop and job shop scheduling. In open shop problems there is no order on constraints and their processing. In job shop scheduling problems, the jobs are operated in order. In flow shop scheduling problems, all the jobs are operating on all machines and precisely one action is for every machine. In flow shop scheduling each job assigns the proper sequence on each machine hence researchers are using flow shop problems for research work.

Yoga is the best way for improving concentration of our mind. By using the different techniques of yoga we can realize the mind scheduling. For this there is a need of taking rest or breaks while scheduling the work of whole day. Division of the efforts make possible to give fruitful productivity. Research from Pertz Lavie on ultradian rhythms finds that after doing the work for 90 minutes followed by the rest of 15 to 20 minutes has been more effective as compared to the continues work done without breaks. Means if we take rest for some time then the thinking power of our mind increases and it works fast .Also it increases the self control of mind. It is seen that the people who are doing yoga regularly have high moral values and religious power of mind, skill of expressing the thoughts, healthy mind, and ability of scheduling the

given task. Yoga is helpful in developing positive attitude; motivate to become powerful in life.

Scheduling by grouping of jobs –

By using the concept of grouping of jobs, we can easily find the optimum solution. The concept of grouping of jobs is related with setup time, weight, size, number of jobs and transportation time from one machine to another machine. Through this process we can operate maximum jobs at a time through one machine. For ex. Jobs might be placed in an oven for heat treat operation. The oven has a finite capacity so several jobs can be processed simultaneously. As in baking cookies, a group of jobs processed together is called a batch, and it is called a batch processing model.

In the scheduling of job families, let J be the number of jobs and I be the family of jobs. The total family of jobs is referred as F. When there is single machine problem then the value of F becomes 1. Shortest processing time minimizes total flow time and Earliest due date minimizes maximum lateness. Hence the value of F is always greater than 1. For each family number of setups required is equal to F. This will reduce the time spent on setup which is called as group technology assumption. In group technology solution the time required for the process is least as additional setups increases the makespan. If t_i denotes the time required for total process of family F then $t_i = \sum_{j=1}^n t_{ij}$

Then the makespan for a GT solution is given by $M = \sum_{i=1}^F s_i + t_i$, where s_i is set up time and p_i is total processing time.

Minimization of Total weighted Flowtime :

For minimizing the total weighted flow time the F problem is the simple problem in GT solution. In families the jobs are arranged by shortest processing time. The family can be treated by sequencing of jobs developing the rules for sequences. This includes the setup time as well as processing time for the job but there is no change

in final result. Finally there are nondecreasing ratios $(s_i + t_i)/w_i$ in optimal sequence.

Let w_{ij} be the weighting factor of job then

$w_i = \sum_{j=1}^{n_i} w_{ij}$ The family is treated as composite job and each job is scheduled by shortest weightage processing time. Hence in Fw problem of group technology families should be arranged in nondecreasing order of $(s_i + t_i)/w_i$.

Let us consider the F-problem of 2 families which contain 3 jobs with set up time of 2 for each family.

Job(i,j)	(1,1)	(1,2)	(2,1)
t_{ij}	3	8	5
Flowtime	2+3=5	13	20

If the schedule of first family is at number 1 then the flow time three jobs in schedule are 5, 13, 20. Hence the total flow time becomes 38. If this sequence is reversed then the total flow time remains same. Now the jobs are arranged in sequence as shown in the table given below with same set up time.

Job(i,j)	(1,1)	(2,1)	(1,2)
t_{ij}	3	5	8
Flowtime	5	10	20

Then the flow time of jobs are 5,10,20 and the flow time is 35. This shows that the optimal solution of the problem can be easily found by splitting the families.

By using the concept of earliest due date we can solve Lmax problem for minimizing maximum lateness assuming that every job has been considered with its own due date.

If all the jobs have same due date in the family then the group technology solution is nothing but the optimal solution.

Two machine flow shop problem for minimization of makespan- Using Group Technology, we can easily solve two machine problems as we can reduce job ordering if there were only one family and no need for setups. Johnson’s rule is applicable for ordering the jobs

tij	1	3	5	4	7	8
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If we split the jobs in batches then the completion time can be calculated as follows-

Johnson’s Rule for two machines scheduling –

If any work starts with two machines then we know that first machine that is machine1 always starts working at time (t) equal to zero. When machine 1 is in working of first job that time machine 2 is not in working hence the job of minimum time should do on machine 1 first .This will decrease the rest period of machine 2.If machine 2 finished job early and processing of first job of next part of machine 1 is not finished then machine 2 has to wait for next job. So Johnson’s Rule states that second job should be arranged in such a way that it will take maximum time for second operation.

batch	Jobs	Time Ci
1	(1,2)	7
2	(3,4)	19
3	(5,6)	37

The above table shows that the two jobs are completed at the time of 7, again two more jobs at 19 and last two at 37. So the total flow time is $F = \sum_i niCi$

For example:

	P ₁	P ₂	P ₃
M ₁	7	5	8
M ₂	8	10	6

According to Johnson’s Rule the sequence for given example is P₂ P₁ P₃ .

$$F = 2(7)+2(19)+2(37) = 126$$

Scheduling with batch availability- In grouping we can process many jobs at a time and thus reduce the number of setups. This way the jobs are completed in minimum time and are ready for transportation. But in batch availability all the jobs in a batch are ready at the same moment. This concept of batch availability is useful in the problems where the jobs are transported and delivered in containers like trucks, boxes etc. We consider the F-problem for one family for minimizing the total flow time with 6 jobs and setup time equal to 3with processing time tij.

Conclusion – Scheduling methods involves the various techniques, planning, sequencing the steps involved in the process which helps us to optimize the output with minimum efforts. In this paper some methods of this scheduling are highlighted like mind scheduling as it is core method and is used in every type scheduling. Also the group technology with batch availability reduces the flow time and minimizes the completion time of the product. In F-problem this concept is useful for getting the optimal solution in which the jobs appear in nondecreasing order of their processing time.

Job j	1	2	3	4	5	6
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