**Question 2**

The following diagrams are concerned with a system which is an extension of the system described in [3]. The new system Sys-new is subject to variable arrival rates of requests. Two arrival rates : *ʎlow* and *ʎhigh*. are considered. A load parameter *f*  is introduced which determines the proportion of time Sys-new is subject to *ʎlow*

P-new (Proportion of late jobs) , average job turnaround time (T-new) and scheduling overhead (O-new) are calculated for different values of *f* with a system where MRCP-RM is appliedand graphs are drawn. Following is the explanation of the result captured . In case of *P* and *T* , results are also captured for MinEDF-WC for comparison.

**P-new:**

|  |  |  |
| --- | --- | --- |
| f | P(MRCP-RM) | P(MinEDF-WC) |
| 0 | 0.232 | 1 |
| 0.2 | 0.206 | 0.98 |
| 0.4 | 0.18 | 0.96 |
| 0.6 | 0.154 | 0.94 |
| 0.8 | 0.128 | 0.92 |
| 1 | 0.102 | 0.9 |

As from the above graph, it can be seen that the Proportion of late jobs *P* increases with high arrival rates of jobs. The value of *P* is maximum for both MRCP-RM and MinEDF-WC when f=0 (Sys-new is subject to 100% high arrival rate). With the increase in the percentage of jobs with low arrival rate, *P* decreases by .2 (Approximate) for both MRCP-RM and MinEDF-WC. The increase in the late jobs with high arrival rate can be attributed to the increasing contention of resources with high arrival of jobs. In comparison with MinEDF-WC , MRCP-RM achieves much lower *P*  in all of the values of load parameter f. The finding is consistent with the finding of paper (3) [3]

**T-new**

|  |  |  |
| --- | --- | --- |
| **f** | **T(MRCP-RM)** | **T(MINIEDF-WC)** |
| 0 | 4212.3786 | 4525 |
| 0.2 | 4203.0894 | 4500 |
| 0.4 | 4193.8002 | 4475 |
| 0.6 | 4184.511 | 4450 |
| 0.8 | 4175.2218 | 4425 |
| 1 | 4165.9326 | 4400 |

The results of T-new show that the turnaround time *T* of MRCP-RM is significantly less than the turnaround time *T* of MinEDF-WC for all values of f. With the increase of f (Increase in percentage of low arrival of jobs) *T* decreases which can be attributed to higher contention of resources when arrival rates are high in which case not all jobs gets to start executing at their earliest start times. This finding aligns with the finding of paper[3]. With Increasing percentage of low arrival rate , *T* decreases by a constant of 9.28 for MRCP-RM and 25 for MinEDF-WC.

**O-new**

|  |  |
| --- | --- |
| f | O(MRCP-RM) |
| 0 | 3.04363 |
| 0.2 | 2.774236 |
| 0.4 | 2.504902 |
| 0.6 | 2.235538 |
| 0.8 | 1.966174 |
| 1 | 1.69681 |

The results of O-new in Figure 3 show that the processing overhead of MRCP-RM decreases as f increases (percentage of low arrivals increases) which is again consistent with paper (3) where it is observed that when arrival rates are high then there are more tasks present which have started but not finished executing. When this scenario occurs, additional constraints are needed that progressively increase the model generation and solving times and therefore increase the overhead.