**Solution – Practice Set**

**CS 425 Homework #2 150 Points**

**Calculate the wait time W(Pi) and turnaround time TTRnd(Pi) for all processes under the given process management policies assuming your computer has four processors. Draw the Gantt chart for each processor.**

1. **Shortest Job Next (SNJ) (50 points) Ready List**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **I** | **Arrival Time** | **Pi** | **W(Pi)** | **TTRnd(Pi)** |
| **1** | **0** | **300** | **0** | **300** |
| **2** | **30** | **200** | **0** | **200** |
| **3** | **50** | **100** | **0** | **100** |
| **4** | **90** | **400** | **0** | **400** |
| **5** | **110** | **150** | **40** | **190** |
| **6** | **130** | **250** | **170** | **420** |
| **7** | **150** | **200** | **130** | **330** |
| **8** | **170** | **450** | **310** | **760** |
| **9** | **180** | **350** | **120** | **470** |
| **10** | **210** | **50** | **20** | **70** |

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

**Average:**

**Gantt Charts:**

**Processor 1:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **0 ----------------- 300** | | | **550** | |  |  |  |  |  |
| **P1** |  |  | **P6** |  |  |  |  |  |  |

**Processor 2:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **30 -------------230** | | **280** | **480** | | **930** | | |  |  |
| **P2** |  | **P10** | **P7** |  | **P8** |  |  |  |  |

**Processor 3:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **50 ------150** | | **300** | **650** | | |  |  |  |  |
| **P3** |  | **P5** | **P9** |  |  |  |  |  |  |

**Processor 4:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **90 ---------------------------------------490** | | | |  |  |  |  |  |  |
| **P4** |  |  |  |  |  |  |  |  |  |

1. **Round Robin (time quantum of 100) (50 points)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **I** | **Arrival Time** | **Pi** | **W(Pi)** | **TTRnd(Pi)** |
| **1** | **0** | **300** | **0** | **390** |
| **2** | **30** | **200** | **0** | **370** |
| **3** | **50** | **100** | **0** | **100** |
| **4** | **90** | **400** | **0** | **590** |
| **5** | **110** | **150** | **20** | **270** |
| **6** | **130** | **250** | **20** | **410** |
| **7** | **150** | **200** | **40** | **340** |
| **8** | **170** | **450** | **30** | **560** |
| **9** | **180** | **350** | **50** | **370** |
| **10** | **210** | **50** | **40** | **90** |

**Average:**

**Gantt Chart:**

**Processor 1:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **100** | **200** | **300** | **400** | **500** | **600** | **700** | **750** |  |  |
| **P1** | **P1** | **P8** | **P2** | **P8** | **P8** | **P8** | **P8** |  |  |

**Processor 2:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **30 --130** | **230** | **330** | **380** | **480** | **580** | **680** |  |  |  |
| **P2** | **P5** | **P9** | **P5** | **P6** | **P4** | **P4** |  |  |  |

**Processor 3:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **50 --- 150** | **250** | **300** | **400** | **500** | **600** | **650** |  |  |
| **P3** | **P6** | **P10** | **P4** | **P9** | **P9** | **P9** |  |  |

**Processor 4:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **90 --190** | **290** | **390** | **490** | **540** |  |  |  |  |
| **P4** | **P7** | **P1** | **P7** | **P6** |  |  |  |  |

# Assuming that each process has the number of threads indicated and threads require equal time, use SJN scheduling (50 points)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **I** | **#**  **threads** | **Arrival Time** | **Pi** | **W(Pi)** | **TTRnd(Pi)** |  |  |
| **1** | **3** | **0** | **300** | **0** | **100** | **P1(1),p1(2).p1(3)** | **100** |
| **2** | **2** | **30** | **200** | **0** | **170** | **P2(1),p2(2)** | **100** |
| **3** | **1** | **50** | **100** | **50** | **150** | **P3(1)** | **100** |
| **4** | **2** | **90** | **400** | **10** | **440** | **P4(1), p4(2)** | **200** |
| **5** | **1** | **110** | **150** | **20** | **170** | **P5(1)** | **150** |
| **6** | **1** | **130** | **250** | **320** | **570** | **P6(1)** | **250** |
| **7** | **2** | **150** | **200** | **50** | **150** | **P7(1), p7(2)** | **100** |
| **8** | **3** | **170** | **450** | **130** | **280** | **P8(1),p8(2),p8(3)** | **150** |
| **9** | **1** | **180** | **350** | **270** | **620** | **P9(1)** | **350** |
| **10** | **1** | **210** | **50** | **70** | **90** | **P10(1)** | **50** |

**Ready queue 🡪**

**Gantt Chart:**

**Processor 1:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **100** | **200** | **300** | **450** | **700** |  |  |  |  |  |
| **P1(1)** | **P2(2)** | **P7(1)** | **P8(1)** | **P6(1)** |  |  |  |  |  |

**Processor 2:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **100** | **200** | **300** | **450** | **800** |  |  |  |  |  |
| **P1(2)** | **P3(1)** | **P7(2)** | **P8(2)** | **P9(1)** |  |  |  |  |  |

**Processor 3:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **100** | **300** | | **450** |  |  |  |  |  |  |
| **P1(3)** | **P4(1)** |  | **P8(3)** |  |  |  |  |  |  |

**Processor 4:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **30 -130** | **280** | **330** | **530** |  |  |  |  |  |  |
| **P2(1)** | **P5(1)** | **P10(1)** | **P4(2)** |  |  |  |  |  |  |