**Problem#1**

For the following network, manually perform resource-constrained scheduling (no more than nine laborers per day at any time).

****

**Problem #2**

For the following network, manually perform resource leveling (start low, increase the resource use gradually till it peaks around the middle of the project, and then gradually decrease it toward the end of the project).



**Problem #3**

A roofer is working to cover 2,500-square-foot roof. He must first install rafters, then sheathing , then felt, and finally shingles. He assumes that the previous tasks represent 35%, 20%, 15%, and 30% of the total roofing activity. At a certain point, he gets the following information on the subtasks:

|  |  |  |  |
| --- | --- | --- | --- |
| Subtask | Unit | Total Quantity | Installed Quantity |
| Rafters | Each | 150 | 102 |
| Sheathing | Square feet | 2720 | 1200 |
| Felt | Square feet | 2720 | 1000 |
| Shingles | Square feet | 2720 | 500 |

Calculate the estimated percent complete for the roofing activity.

**Problem #4**

A mason contracted with a general contractor to build an exterior wall using 2952 concrete blocks. The mason must finish the wall in 3 days and gets paid $4 per block. At the end of day 1, the mason has installed 220 blocks. Her actual cost (including overhead and profit) was $836. Analyze the situation with regards to both the budget and the schedule.

**Problem #5**

Calculate the weighted unit cost per square foot for the project data shown, and determine the cost of a 2,700-sf project.

|  |  |  |
| --- | --- | --- |
| Project | Total Cost | Size, m2 |
| 1 | $147,300 | 258 |
| 2 | $153,700 | 290 |
| 3 | $128,100 | 210 |
| 4 | $118,400 | 185 |
| 5 | $135,700 | 230 |

**Problem #6**

The cost of a 540-cf/hr process unit is $850,000. From historical cost records, the capacity ratio exponent of a process unit is 0.6. Use the capacity ratios raised to an exponent method to determine the estimated cost of a similar process unit of a capacity of 490 cf/hr.