Prob2,

```
FASTER-ALL-PAIRS-SHORTEST-PATHS(W):
    n = W.rows
    L.^1= W
     m = 1
    while m<n -1:
        let L.^2m be a new n X n matrix
        L.^2m = EXTEND-SHORTEST-PATHS(L.^m,L.^m)
        m = 2m
    L^check = EXTEND-SHORTEST-PATHS(L.^m,L.^m)
    For i = 1 to n
        If L^check_ii <0:
            Print: "the graph contains a negative-weight cycle"
    return L.^m
```

We can detect the existence of negative cycles simply by checking whether there are negative values on the diagonal (which is L_{ii}) of the matrix $L^{(n)}$. Since the shortest weight circle might need to n edges, so we should calculate the matrix up to a least L^n which is L^{check}.