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                                gen_inf_prob_matrix
function  inf_prob_matrix = gen_inf_prob_matrix(S_mat,prob_mat,N);

    inf_prob_matrix = zeros(N,N);

    S_prob_mat = generate_S_mat_distribution(S_mat);

    for i = 1 : N
        for j = 1 : N
            inf_prob_matrix(i,j) = inf_weighted_prob([S_prob_mat(i,j) prob_mat(i,j)]);
        endfor
    endfor
endfunction

```