Exercise: Write an Optimization Problem

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Consider N sensors $s_1, \ldots, s_N$ sensing an environment. Each sensor s_i sends some data to an IoT gateway every second. Processing of data produced by sensor s_i requires r_i resources (e.g., number of operations). In addition, each sensor has a different priority p_i, which defines the importance of the data produced by s_i, $\forall i = 1, \ldots, N$. The gateway has limited resources g (i.e., g is the number of operations that it can perform in one second). The gateway collects the data coming from the sensors and processes it, limited to its resources. If the resources required for processing the data of all sensors are greater than the available resources g, the gateway processes the data coming from selected sensors in such a way that the overall priority is maximized.
Write an optimization problem that models this system. Is the problem hard to solve? What are the possible ways to solve it?
(Hint: you need N binary decision variables $x_1, \ldots, x_N$.)