Risk analysis lab 2019. 10. 08. (Calculating risk)

1. Let $h_i$ denote the amount of deposit belongs to each client $i = 1, ..., M$ with $p_i = P(X_i = h_i)$ and $X_i \in \{0; h_i\}$ probability of withdrawal. In a new script generate these vectors randomly as $h_i \sim N(\mu = 1600, \sigma = 200)$ and $p_i \sim U(0, 1)$. $M = 17$ (1 point)

2. Let $y_i \in \{0; 1\}$ stands for the event when the $i$-th customer withdraws their deposit, while $\psi \in \{0, 1\}$ denotes the event that the bank exceeds its cash $C$. Calculate $E(\psi) = P\left(\sum_{i=1}^{M} y_i h_i > C\right)$ analytically (Sum $\prod_{i=1}^{M} p_i^{y_i}(1 - p_i)^{1-y_i}$ over all possible $y$ vectors).
   
a. First, create an array of all possible $y$ vectors. The simplest solution is to make a binary counter, and store its results. You should create a function for this.
      (2 points)

   b. Then make the summation.
      (2 points)

   c. Test it for $C = \{10000, 11000, 12000, 13000, 14000, 15000\}$.

$P = \text{analytical}(h, p, C)$