Risk analysis lab 2016. 09. 26. (Calculating risk)

1. Let \( h_i \) denote the amount of deposit belongs to each client \( i = 1, \ldots, M \) 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 \( h_i \sim N(\mu = 1000, \sigma = 250) \) and \( p_i \sim U(0,1) \). \( M = 18 \)

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 \( C = 20000 \).

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