```
% Question 1 Part(a)
function [Call_Value,Put_Value,StdCall,StdPut] = MonteCarlo(M,delta)

randn('state',100);

% Define parameters
sigma = 0.20; % volatility
r = 0.05;     % risk free rate
T = 1.0;      % time to expiry
K = 100;      % strike price
S0 = 100;     % initial asset price
N = T/delta;   % number of timesteps



drift = r*delta; % compute drift rate
sigma_sqrt_delta = sigma*sqrt(delta);

S_old = zeros(M,1); % generate a M x 1 zero matrix
S_new = zeros(M,1);
S_old(1:M,1) = S0;


for i = 1:N
    S_new(:,1) = S_old(:,1) + S_old(:,1).*(drift + sigma_sqrt_delta*randn(M,1));
    S_new(:,1) = max(0.0, S_new(:,1)); % check S_new cannot be < 0
    S_old(:,1) = S_new(:,1);
end

% Define the formula to compute payoff of the option
payoff_call = max((S_new - K), 0);
payoff_put = max((K - S_new), 0);

% Define the formula to compute approximate value of the option
Call_Value = exp(-r*T)*(sum(payoff_call))/M;
Put_Value = exp(-r*T)*(sum(payoff_put))/M;

% Define the formula to compute standard deviation of the option
StdCall = std(exp(-r*T)*(payoff_call));
StdPut = std(exp(-r*T)*(payoff_put));

end
```