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% 2017 Spring EE 380 Section 6
% Project 5
% Aaron Turner
% #011502541
%
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%
 _____________________________________________________________________
% For 100 fair coins, all tossed at the same time, what is the
 probability
% 50 of them are heads?
% 100C50 (.5)^50 * (.5)^50
function project5 (trialstorun)

format long % This will increase the expressed precision

% ---------------------------------------------------------------------
% Problem Statement
% ---------------------------------------------------------------------

display(' ');
display('Problem: ');
display('For 100 fair coins, all tossed at the same time, what is the
 probability 50 of them are heads?');
display(' ');

% ---------------------------------------------------------------------
% Theory/Practice problem
% ---------------------------------------------------------------------

display(' ');
display('-------------------------------------------------------------');
display('Theory/Practice problem');
display('-------------------------------------------------------------');
display(' ');

% Find Our combination
combination = nchoosek(100, 50);
% Multiply by our probabilities
answer = combination * (0.5)^50 * (0.5)^50;

display('100C50 (.5)^50 * (.5)^50');
display('The answer is:');
answer


% ---------------------------------------------------------------------
% Simulation problem
% ---------------------------------------------------------------------

display(' ');
display('-------------------------------------------------------------');
```

```
display('Simulation problem');
display('------------------------------------------------------------');
display(' ');

% Trials to run passed in as input argument, for publishing
%trialstorun = input('Enter number of experiements ');

results = zeros(trialstorun, 1);

for x = 0:trialstorun
    numFlips = 100; % Number of coin flips per experiement
    heads = sum(round(rand(numFlips, 1)));

    if heads == 50
        results (x, 1) = 1;
    end
end

probability = sum(results) / trialstorun;

display('Number of experiements run:');
trialstorun
display('Probability of exaclty 50 heads after the input number of
 experiements:');
probability
```

Problem:
For 100 fair coins, all tossed at the same time, what is the probability 50 of them are heads?

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Theory/Practice problem
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Warning: Result may not be exact. Coefficient is greater than 9.007199e+15 and
is only accurate to 15 digits
*100C50 (.5)^50 * (.5)^50*
The answer is:

answer =

0.079589237387179

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Simulation problem
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Number of experiements run:

trialstorun =

```
      100000

Probability of exaclty 50 heads after the input number of
 experiements:

probability =

   0.079820000000000
```

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