# Cody Problem 60. The Goldbach Conjecture

The Goldbach conjecture

asserts that every even integer greater than 2 can be expressed as the sum of two primes.

Given the even integer n, return primes p1 and p2 that satisfy the condition n = p1 + p2. Note that the primes are not always unique. The test is not sensitive to order or uniqueness. You just need to meet the appropriate conditions.

Example:

```
% Input  n = 286
% Output (any of the following is acceptable)
%        [  3 283]
%        [283   3]
%        [  5 281]
%        [107 179]
%        [137 149]
```

## Scratch Pad

```
n = 286
```

```
n = 286
```

```
[p1,p2] = goldbach(n)
```

```
p1 = 3
p2 = 283
```

## Solution

```
function [p1,p2] = goldbach(n)
    p1 = [];
    p2 = [];
    if mod(n,2) ~= 0
        p1 = [];
        p2 = [];
    else
        Plist = [];
        for i=1:n-1
            if isprime(i)
                Plist = [Plist, i];
            end
        end
        combinations = nchoosek(Plist, 2);
        sums = sum(combinations, 2);
        out = combinations(find(sums == n, 1),:);
```

```
        p1 = out(1);
        p2 = out(2);
    end
end
```