

I. The number of odd coefficient in an expansion

The function considers two cases: when n is odd and when n is even. The naive way.

```
lb[n_] := Module[{obc = {}, ebc = {}}, If[EvenQ[n],
  For[i = 0, i < (n/2) + 1, i++,
    If[OddQ[Binomial[n, i]],
      AppendTo[obc, Binomial[n, i]], AppendTo[ebc, Binomial[n, i]]]
  ],
  For[k = 0, k < (n + 1)/2, k++,
    If[OddQ[Binomial[n, k]],
      AppendTo[obc, Binomial[n, k]], AppendTo[ebc, Binomial[n, k]]]
  ]
];
num = {"Odd:" Length[obc]}, {"Even:" Length[ebc]}
(*Index 1 holds number of distinct odd coefficients,
Index 2 holds number of distinct even coefficients*)
]
```

Another way of finding the odd numbers in the expansion $(x + y)^n$. When I understood Tables and the Count functions.

```
lb1[n_] := Module[{i},
  l = Count[Table[Binomial[n, i], {i, 0, n}] // OddQ, True]/2;
  Print["The distinct odd number(s) with n = ", n, " is/are: ", l]
];
```

```
lb1[100]
```

```
The distinct odd number(s) with n = 100 is/are: 4
```