Project 2

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Contents

1 Python Code

```
from math import factorial

def Pascal(numRows):
    triangle=""
    for i in range(numRows+1):
        for j in range(numRows-i+1):
            triangle+="  "
        # loop to get elements of row i
        for j in range(i+1):
            # nCr = n!/((n-r)!*r!)
            triangle+=( str(factorial(i)//(factorial(j)*factorial(i-j))) + "   " )

        triangle+="\n"

    return triangle
```

2 Print Pascal's Triangle

2.1 $(s-t)^{10}$

```
Pascal(10)
```

```
                    1
                  1   1
                1   2   1
              1   3   3   1
            1   4   6   4   1
          1   5   10   10   5   1
        1   6   15   20   15   6   1
      1   7   21   35   35   21   7   1
    1   8   28   56   70   56   28   8   1
  1   9   36   84   126   126   84   36   9   1
1   10   45   120   210   252   210   120   45   10   1
```

Binomial Expansion: $s^{10}+10s^9t+45s^8t^2+120s^7t^3+210s^6t^4+252s^5t^5+210s^4t^6+120s^3t^7+45s^2t^8+10st^9+t^{10}$

2.2 $(2x + y)^5$

```
Pascal(5)
```

```
          1
        1   1
      1   2   1
    1   3   3   1
  1   4   6   4   1
1   5   10   10   5   1
```

Binomial Expansion: $2x^5+5(2x)^4y+10(2x)^3y^2+10(2x)^2y^3+5(2x)y^4+y^5$

3 List elements of a power set

3.1 Python

```
from itertools import chain, combinations

def powerset(given):
    s=list(given)
    result=chain.from_iterable(combinations(s,r) for r in range(len(s)+1))
    return result

# example
my_set={1,2,3,4}
str(list(powerset(my_set)))
```

1
2
3
4
1 2
1 3
1 4
2 3
2 4
3 4
1 2 3
1 2 4
1 3 4
2 3 4
1 2 3 4