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## Interpolation Polynomial with Python

Contoh Input/Output

Format input:

```
n-1
x1 y1
x2 y2
...
xn-1 yn-1
xn yn
```

Format output:

```
ax**n + bx**n-1 + ... + px + q
```

yang berarti  $y = ax^n + bx^{n-1} + \dots + px + q$

dengan `**` merupakan pangkat yang berarti  $ax^n = ax^n$

$N = n - 1$

### 1. $N = 1$

The screenshot shows a Python script execution environment. On the left, there are two text editors: 'input.txt' and 'output.txt'. The 'input.txt' file contains the following content:

```
1 1
2 1 1
3 -4 2
```

The 'output.txt' file contains the following content:

```
1 1.2 - 0.2*x
```

On the right, a PowerShell terminal window shows the execution of a Python script. The commands and output are as follows:

```
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src> python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: 1.2 - 0.2*x
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>
```

## 2. $N = 2$

```
input.txt U × ...
One more time > python > test > input.txt
1 2
2 1 2
3 2 3
4 3 4

output.txt U × ...
One more time > python > test > output.txt
1 x + 1.0

powershell ×
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>
python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: x + 1.0
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>
```

## 3. $N = 2$

```
input.txt U × ...
One more time > python > test > input.txt
1 2
2 1 2
3 2 3
4 3 5

output.txt U × ...
One more time > python > test > output.txt
1 0.5*x**2 - 0.5*x + 2.0

powershell ×
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>
python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: 0.5*x**2 - 0.5*x + 2.0
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>
```

## 4. $N = 3$

```
input.txt U × ...
One more time > python > test > input.txt
1 3
2 1 1
3 2 4
4 3 9
5 4 16

output.txt U × ...
One more time > python > test > output.txt
1 x**2

powershell ×
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>
python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: x**2
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>
```

## 5. $N = 3$

The screenshot shows a code editor with three tabs: `input.txt`, `output.txt`, and `powershell`. The `input.txt` tab contains the following data:

```

1 3
2 1 2
3 2 3
4 3 4
5 4 5

```

The `output.txt` tab contains the following data:

```

1 x + 1.0

```

The `powershell` terminal window shows the execution of a Python script:

```

PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src> python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: x**2
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src> python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: x + 1.0
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>

```

## 6. $N = 3$

The screenshot shows a code editor with three tabs: `input.txt`, `output.txt`, and `powershell`. The `input.txt` tab contains the following data:

```

1 3
2 1 10
3 2 2
4 3 5
5 4 1

```

The `output.txt` tab contains the following data:

```

1 -3.0*x**3 + 23.5*x**2 - 57.5*x + 47.0

```

The `powershell` terminal window shows the execution of a Python script:

```

PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src> python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: -3.0*x**3 + 23.5*x**2 - 57.5*x + 47.0
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>

```

## 7. $N = 10$

The screenshot shows a code editor with three tabs: `input.txt`, `output.txt`, and `powershell`. The `input.txt` tab contains the following data:

```

1 10
2 1 10
3 2 2
4 3 5
5 4 1
6 6 1
7 -10 -10
8 0 0
9 18 100
10 -100 100
11 200 10
12 150 -150

```

The `output.txt` tab contains the following data:

```

1 2158e-10*x**10 + 2.2365e-7*x**9 - 4.5966e-7*x**8 - 0.0025566*x**7 + 0.055173*x**6 - 0.

```

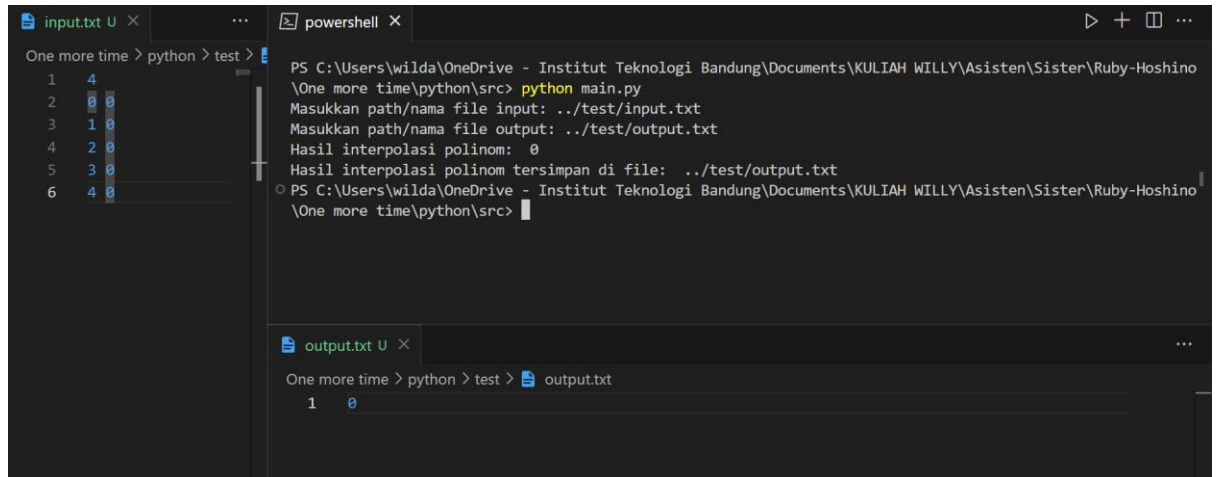
The `powershell` terminal window shows the execution of a Python script:

```

PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src> python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: -8.2158e-10*x**10 + 2.2365e-7*x**9 - 4.5966e-7*x**8 - 0.0025566*x**7 + 0.055173*x**6 - 0.0059764*x**5 - 4.5909*x**4 + 28.332*x**3 - 63.319*x**2 + 49.532*x
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>

```

8.  $N = 4$

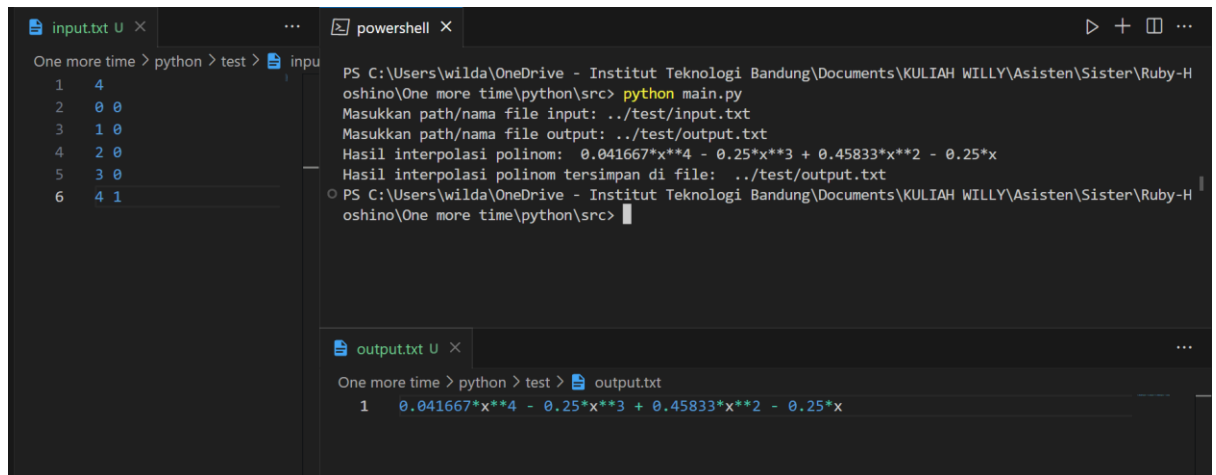


```
input.txt U × ... powershell ×
One more time > python > test >
1 4
2 0 0
3 1 0
4 2 0
5 3 0
6 4 0

PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src> python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: 0
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>

output.txt U ×
One more time > python > test > output.txt
1 0
```

9.  $N = 4$

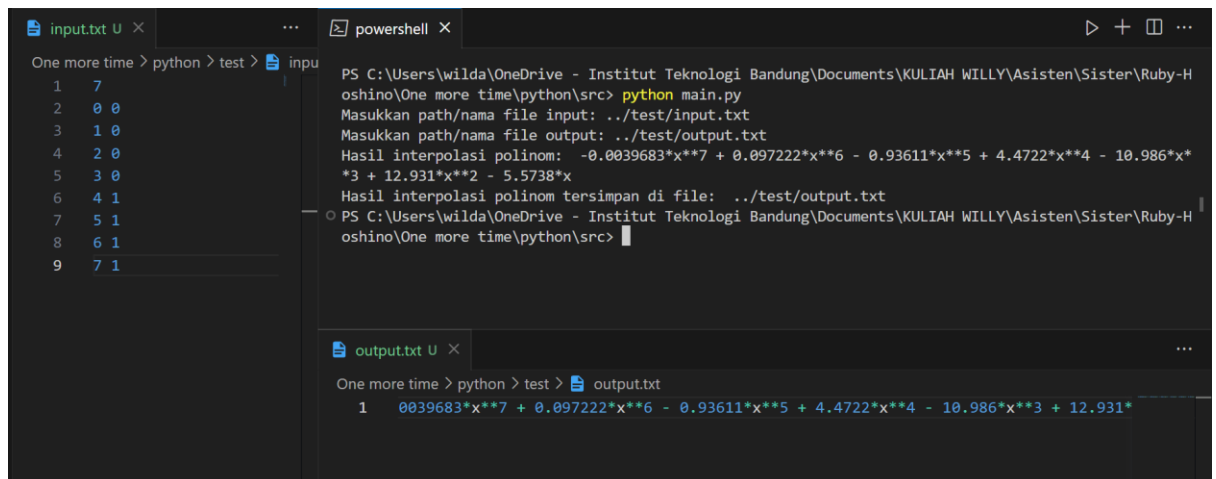


```
input.txt U × ... powershell ×
One more time > python > test > input
1 4
2 0 0
3 1 0
4 2 0
5 3 0
6 4 1

PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src> python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: 0.041667*x**4 - 0.25*x**3 + 0.45833*x**2 - 0.25*x
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>

output.txt U ×
One more time > python > test > output.txt
1 0.041667*x**4 - 0.25*x**3 + 0.45833*x**2 - 0.25*x
```

10.  $N = 7$



```
input.txt U × ... powershell ×
One more time > python > test > input
1 7
2 0 0
3 1 0
4 2 0
5 3 0
6 4 1
7 5 1
8 6 1
9 7 1

PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src> python main.py
Masukkan path/nama file input: ../test/input.txt
Masukkan path/nama file output: ../test/output.txt
Hasil interpolasi polinom: -0.0039683*x**7 + 0.097222*x**6 - 0.93611*x**5 + 4.4722*x**4 - 10.986*x**3 + 12.931*x**2 - 5.5738*x
Hasil interpolasi polinom tersimpan di file: ../test/output.txt
PS C:\Users\wilda\OneDrive - Institut Teknologi Bandung\Documents\KULIAH WILLY\Asisten\Sister\Ruby-Hoshino\One more time\python\src>

output.txt U ×
One more time > python > test > output.txt
1 -0.0039683*x**7 + 0.097222*x**6 - 0.93611*x**5 + 4.4722*x**4 - 10.986*x**3 + 12.931*x**2 - 5.5738*x
```