HW2 POLYNOMIAL

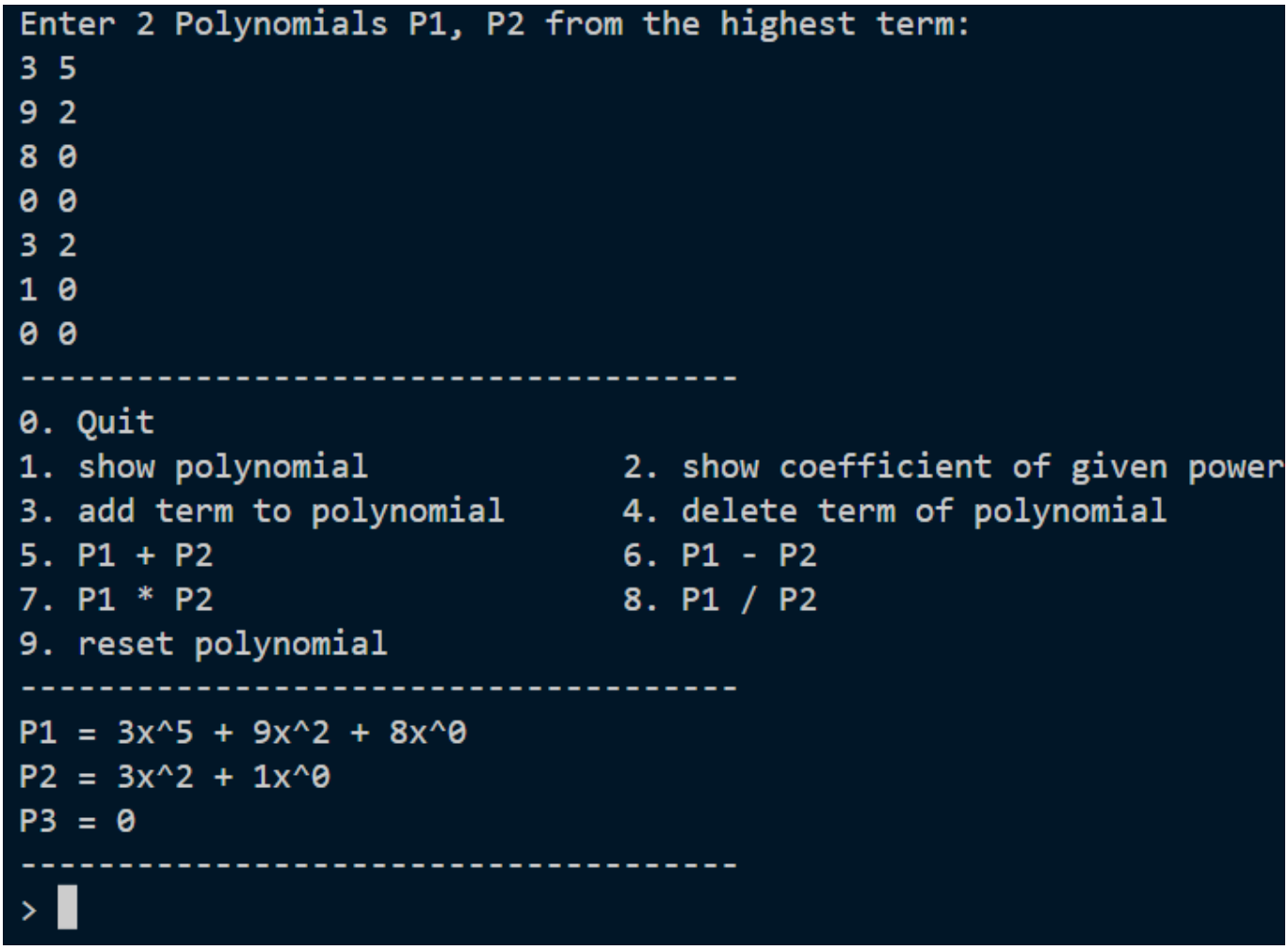
> 以 circular linked list 實作多項式加減乘除等操作。可使用浮點數係數與負次方

Struct 宣告

```
typedef struct Node{
    int expo;
    double coeff;
    struct Node *next;
}node;
```

輸入格式與說明

> - 程式包含兩個多項式 P1 & P2，程式執行時須先進行輸入
> - 多項式輸入由高次方到低次方，輸入項數時個格式是 coeff power，中間用空格分開。結尾輸入 "0 0" 表示該多項式輸入結束 e.g. "3 2" 就表示 3x^2
> - 直接輸入指令相對應的數字來進行該指令，如 要跳出程式，則輸入 0



範例輸入:

P1: 3x^5 + 9x^2 + 8

P2: 3x^2 + 1

```
3 5
9 2
8 0
0 0
3 2
1 0
0 0
```

---

0. Quit

> 結束程式

1. Show polynomial

menu

> 輸入多項式編號(1, 2, 3)，以降冪顯示該多項式

```
> 1
Which polynomial(1,2,3): 1
P1 = 3x^5 + 9x^2 + 8x^0
---------------------------------------
```

2. Show coefficient of given power

menu

> 輸入多項式編號與所尋找的次方，顯示多項式中該次方項的係數

```
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 1x^3 - 0.333333x^1 + 3x^0
---------------------------------------
> 2
Which polynomial(1,2,3):
3
Which power: 1
x^1 : -0.333333
```

3. Add term to polynomial

menu

> 輸入多項式編號、要插入的次方項以及係數

```
--------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 1x^3 - 0.333333x^1 + 3x^0
--------------------------------------
> 3
Which polynomial(1,2,3): 1
Power to add: -4
Coefficient of power: -101
--------------------------------------
0. Quit
1. show polynomial              2. show coefficient of given power
3. add term to polynomial       4. delete term of polynomial
5. P1 + P2                      6. P1 - P2
7. P1 * P2                      8. P1 / P2
9. reset polynomial
--------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0 - 101x^-4
P2 = 3x^2 + 1x^0
P3 = 1x^3 - 0.333333x^1 + 3x^0
--------------------------------------
```

4. Delete term of polynomial

menu

> 輸入多項式編號以及要刪除的項數次方

```
--------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0 - 101x^-4
P2 = 3x^2 + 1x^0
P3 = 1x^3 - 0.333333x^1 + 3x^0
--------------------------------------
> 4
Which polynomial(1,2,3): 1
Power to delete: 2
--------------------------------------
0. Quit
1. show polynomial              2. show coefficient of given power
3. add term to polynomial       4. delete term of polynomial
5. P1 + P2                      6. P1 - P2
7. P1 * P2                      8. P1 / P2
9. reset polynomial
--------------------------------------
P1 = 3x^5 + 8x^0 - 101x^-4
P2 = 3x^2 + 1x^0
P3 = 1x^3 - 0.333333x^1 + 3x^0
--------------------------------------
```

5. Polynomial addition

menu

> 顯示 P1 + P2 並將結果同時存入 P3

```
--------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 0
--------------------------------------
> 5
P1 + P2 = P3 = 3x^5 + 12x^2 + 9x^0
--------------------------------------
0. Quit
1. show polynomial              2. show coefficient of given power
3. add term to polynomial       4. delete term of polynomial
5. P1 + P2                      6. P1 - P2
7. P1 * P2                      8. P1 / P2
9. reset polynomial
--------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 3x^5 + 12x^2 + 9x^0
--------------------------------------
```

6. Polynomial subtraction

> 顯示 P1 - P2 並將結果同時存入 P3

```
--------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 3x^5 + 12x^2 + 9x^0
--------------------------------------
> 6
P1 - P2 = P3 = 3x^5 + 6x^2 + 7x^0
--------------------------------------
0. Quit
1. show polynomial              2. show coefficient of given power
3. add term to polynomial       4. delete term of polynomial
5. P1 + P2                      6. P1 - P2
7. P1 * P2                      8. P1 / P2
9. reset polynomial
--------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 3x^5 + 6x^2 + 7x^0
--------------------------------------
```

menu

7. Polynomial multiplication

> 顯示 P1 * P2 並將結果同時存入 P3

```
---------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 3x^5 + 6x^2 + 7x^0
---------------------------------------
> 7
P1 * P2 = P3 = 9x^7 + 3x^5 + 27x^4 + 33x^2 + 8x^0
---------------------------------------
0. Quit
1. show polynomial              2. show coefficient of given power
3. add term to polynomial       4. delete term of polynomial
5. P1 + P2                      6. P1 - P2
7. P1 * P2                      8. P1 / P2
9. reset polynomial
---------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 9x^7 + 3x^5 + 27x^4 + 33x^2 + 8x^0
---------------------------------------
```

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8. Polynomial division

> 顯示 P1 / P2 的商和餘數，並將商存入 P3

```
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 9x^7 + 3x^5 + 27x^4 + 33x^2 + 8x^0
-------------------------------------
> 8
P1 / P2 = P3 = 1x^3 - 0.333333x^1 + 3x^0 ... 0.333333x^1 + 5x^0
-------------------------------------
0. Quit
1. show polynomial              2. show coefficient of given power
3. add term to polynomial       4. delete term of polynomial
5. P1 + P2                      6. P1 - P2
7. P1 * P2                      8. P1 / P2
9. reset polynomial
-------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 1x^3 - 0.333333x^1 + 3x^0
-------------------------------------
```

menu

9. Reset polynomial

> 輸入多項式編號，重新輸入多項式並覆蓋原本內容

```
-------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 1x^3 - 0.333333x^1 + 3x^0
-------------------------------------
> 9
Which polynomial(1,2,3): 3
0 0
-------------------------------------
0. Quit
1. show polynomial              2. show coefficient of given power
3. add term to polynomial       4. delete term of polynomial
5. P1 + P2                      6. P1 - P2
7. P1 * P2                      8. P1 / P2
9. reset polynomial
-------------------------------------
P1 = 3x^5 + 9x^2 + 8x^0
P2 = 3x^2 + 1x^0
P3 = 0
-------------------------------------
```