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練習題:

實作polynomial 新增非零項、求值

附件:Polynomial.cpp

挑戰題:

實作polynomial 多項式乘法

附件:Polynomial_Mult.cpp

```
void Polynomial::NewTerm(const float newCoef,const int newExp){
    //空間不足時重新配置空間
    if(capacity==terms){
        capacity*=2;
        Term *temp = new Term[capacity];
        copy(termArray, termArray+terms, temp);
        delete[] termArray;
        termArray = temp;
    }
    termArray[terms].coef = newCoef;
    termArray[terms++].term = newExp;
}
```

上圖實作newTerm函式

```
float Polynomial::Eval(float f){
    //多項式求值
    float ans=0;
    for(int i=0; i<terms; i++){
        ans+=termArray[i].coef*pow(f, termArray[i].term);
    }
    return ans;
}
```

上圖實作eval函式

ex.

$2X^8+2X^7+2X^6+2X^5+2X^4+2X^3+2X^2+2X^1+2$
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加分題:

```
Polynomial Polynomial::Mult(Polynomial poly){
    //多項式乘法
    Polynomial c;
    for(int i=0; i<terms; i++){
        for(int j=0; j<poly.terms; j++){
            bool flag=true;
            int cpos=0, Exp=termArray[i].term+poly.termArray[j].term;
            while(flag&&cpos<c.terms){
                if(Exp==c.termArray[cpos].term){
                    flag=false;
                    c.termArray[cpos].coef+=termArray[i].coef*poly.termArray[j].coef;
                }
                cpos++;
            }
            if(flag) c.NewTerm(termArray[i].coef*poly.termArray[j].coef, Exp);
        }
    }
    return c;
}
```

ex.

$(2X^2+2X^1+2) \times (2X^2+2X^1+2) = 4X^4+8X^3+12X^2+8X^1+4$