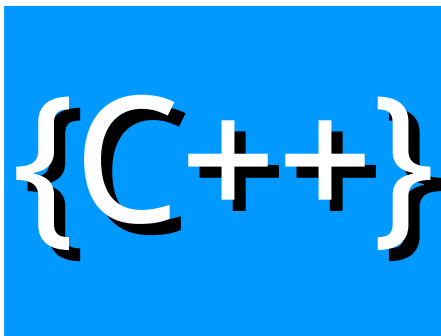




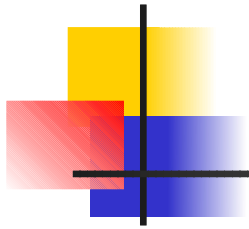
# Template

---

Week 7



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# Template 是程式碼產生器

```
#include <iostream>

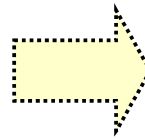
using namespace std;

int add(int left, int right)
{
    return left + right;
}

double add(double left, double right)
{
    return left + right;
}

int main(int argc, const char *argv[])
{
    int a=5, b=1;
    float m=0.5, n=0.01;

    cout << add(a,b) << endl;
    cout << add(m,n) << endl;
    return 0;
}
```



```
#include <iostream>

using namespace std;

template<typename T>
T add(T left, T right)
{
    return left + right;
}

int main(int argc, const char *argv[])
{
    int a=5, b=1;
    float m=0.5, n=0.01;

    cout << add(a,b) << endl;
    cout << add(m,n) << endl;
    return 0;
}
```



# 注意事項

---

不要把 Template Class 的宣告與  
定義分開寫在 .h 跟 .cpp



# 不要這麼做

## class.h

```
template <typename T>
class demo
{
    public:
        demo(T v){ value = v;}
        void set(T v);
    private:
        T value;
};
```

## class.cpp

```
#include "class.h"

template <typename T>
void demo<T>::set(T v)
{
    Value = v;
}
```



# 正確寫法

---

class.h

```
template <typename T>
class demo
{
    public:
        demo(T v){ value = v;}
        void set(T v);
    private:
        T value;
};

template <typename T>
void demo<T>::set(T v)
{
    value = v;
}
```

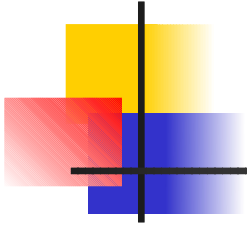


# Assignment 7

---

- 請將 class Array 改寫成 template class，讓 Array 可以儲存任何類別

```
class Array {  
    public:  
        Array(int s);  
        ~Array();  
        void setValue(int index, int  
value);  
        int getValue(int index);  
    private:  
        int Size;  
        int *ArrayPtr;  
};
```



# Assignment 7

## main.cpp

```
#include "array.h"
#include <iostream>
#include <string>

using namespace std;

int main(int argc, const char *argv[])
{
    Array<int> intArray(5);
    intArray.setValue(0,1);
    intArray.setValue(1,2);
    intArray.setValue(2,3);
    intArray.setValue(3,4);
    intArray.setValue(4,5);
    for(int i=0; i<5; i++){
        cout << intArray.getValue(i) << " ";
    }

    cout << endl;

    Array<double> doubleArray(5);
    doubleArray.setValue(0,0.1);
    doubleArray.setValue(1,0.2);
    doubleArray.setValue(2,0.3);
    doubleArray.setValue(3,0.4);
    doubleArray.setValue(4,0.5);
    for(int i=0; i<5; i++){
        cout << doubleArray.getValue(i) << " ";
    }
}
```

```
cout << endl;

Array<string> stringArray(5);
stringArray.setValue(0,"test1");
stringArray.setValue(1,"test2");
stringArray.setValue(2,"test3");
stringArray.setValue(3,"test4");
stringArray.setValue(4,"test5");
for(int i=0; i<5; i++){
    cout << stringArray.getValue(i) << " ";
}

return 0;
}
```