程式題（每題 10%）

1. What will the following code display?

```
// modulus
#include <iostream>
using std::cout;
using std::endl;

int mod(int a, int b)
{
        do    a -= b;
        while (a >= b);
        return a;
}

int main()
{
      cout << mod(622, 7) << endl;
      return 0;
}
```

2. Determine whether the following code has syntax errors or not. If it is correct, predict its output. If it is incorrect, point out the mistake(s).

```
// Caesar Cipher
#include <iostream>
using std::cout;
using std::endl;

void enc(char* a, int key)
{
      while (*a)
      {
            if (*a >= 'A' && *a <='Z')
                  *a = (*a - 'A' + key) % 26 + 'A';
            a++;
      }
}

int main()
{
      char msg[] = "HELLO NCNU";
      enc(msg, 13);
      cout << msg << "\n";
      return 0;
}
```

3. What will the following code display?

```
#include <iostream>
int main() // bitwise operators.
{
      unsigned s = 6228;
      int i = (s >> 4) & ~(~0 << 3);
      std::cout << i << "\n";
     return 0;
}
```

4. Determine whether the following code has syntax errors or not. If it is correct, predict its output. If it is incorrect, point out the mistake(s).

```
// Inheritance
#include <iostream>
using std::cout;
using std::endl;

class Window // Base class
{
public:
      void Create()
      { cout <<"Base class Window" << endl; }
};

class CommandButton : public Window
{
public:
    virtual void Create() // "Try to Override a C++ function"
    { cout<<"Derived class Command Button" << endl; }
};

int main()
{
    Window  *x, *y;

    x = new Window();
    x->Create();

    y = new CommandButton();
    y->Create();
}
```

5. Determine whether the following code has syntax errors or not. If it is correct, predict its output. If it is incorrect, point out the mistake(s).

```
#include <iostream>
using std::cout;
using std::endl;

struct RECT
{ int left;          int top;
  int right;         int bottom;
}

class CRECT
{
public:
  int left;
  int top;
  int right;
  int bottom;

CRECT(int x1, int y1, int x2, int y2) // Constructor
   : left(x1), top(y1), right(x2), bottom(y2) {}

int Area()
  { return (right-left)*(bottom-top); }

}

int main()
{
  RECT aRect = { 10, 10, 60, 60 };     // Initial value
  CRECT bRect(10, 10, 110, 110);       // Initial value
  cout << (aRect.right - aRect.left) *
          (aRect.bottom - aRect.top) << endl;
  cout << bRect.Area() << endl;

  return 0;
}
```

6. Determine whether the following code has syntax errors or not. If it is correct, predict its output. If it is incorrect, point out the mistake(s).

```
#include <iostream>
using std::cout;
using std::endl;

 // This function returns a pointer to an integer

int *max(int a, int b)
{   return (a>b) ? &a : &b; }

int main()
{   cout << *max(53,5)  << endl;
    cout << *max(6,28) << endl;
    return 0;
}
```

7. Determine whether the following code has syntax errors or not. If it is correct, predict its output. If it is incorrect, point out the mistake(s).

```
#include <iostream>
using std::cout;

float average(float a, float b);
float average(float a, float b, float c);

int main()
{   // 3.0 will be output as 3
    cout << average(1.0, 7.2, 5.0) << "\n";
    cout << average(7,0, 5.0) << "\n";
    return 0;
}

float average(float a, float b)
{ return (a+b)/2.0; }

float average(float a, float b, float c)
{ return (a+b+c)/3.0; }
```

8. Determine whether the following code has syntax errors or not. If it is correct, predict its output. If it is incorrect, point out the mistake(s).

```
// Pointer to char
#include <iostream>
#include <string.h>
using std::cout;
using std::endl;

int main()
{
    char s[] = "The Chamber";
    char *p1, *p2;
    char c;

    cout << s << endl;

    for (p2=s; *p2 != '\0'; p2++);
    p2--;
    p1=s;
    while (p1 < p2)
    {
        c = *p1; *p1 = *p2; *p2 = c;
        p1++; p2--;
    }

    cout << s << endl;

    return 0;
}
```

9. Determine whether the following code has syntax errors or not. If it is correct, predict its output. If it is incorrect, point out the mistake(s).

```
#include <iostream>
using std::cout;

int main()
{
   int i, n = 622;
   for (i=1; i<7; i++)
   {
      int n = 0;
      for (int j=1; j<=i; j++)
         n += j;              // scope of variable n
      cout << n << "\n";
   }
      cout << n << "\n";
   return 0;
}
```

10. Determine whether the following code has syntax errors or not. If it is correct, predict its output. If it is incorrect, point out the mistake(s).

```
// Accessing the members of a class
#include <iostream>
using std::cout;
using std::endl;

class CComplex
{
      double real;
      double imaginary;

      CComplex(double a = 0.0, double b = 0):
      real(a), imaginary(b)
      { }

            CComplex operator+(CComplex w)
            { return CComplex(real + w.real,
                  imaginary + w.imaginary); }
      void Show()
      {
            if (real != 0.0) cout << real;
            if (imaginary < 0.0)
                  cout << imaginary << "i";
            else if
                  (imaginary > 0.0)
                  cout << "+" << imaginary << "i";
            cout << "\n";
      }
};

int main()
{
      CComplex c1(6,2);
      CComplex c2(2,1);
      CComplex c3 = c2 + c1;
      c3.Show();              // "cout << 3.0" will display "3".
}
```