所別：電機工程學系碩士班 電子組　　　　科目：計算機概論　共 3 頁 第 1 頁
　　　　　　　　　　　　　　　　　　　　　　　＊請在試卷答案卷（卡）內作答

參考用

I.　[6pt]　Please discuss the difference between local variables, global variables, and static variables in C/C++ language.

II.　[5pt]　Identify and correct the errors of the following code:

```
class Q {
    public:
        int Q(int);
        void setQ(int);
        void printQ();
        int operateQ(int);
    private:
        int qData;
} // end class Q
```

III.　What are the execution results of the following C/C++ program segments ?

(1) [5pt]
```
int a;
double result;
for (a = 1; a <= 10; a++) {
    result = (a + 2) / a;
    printf("(%d + 1) / %d = ", a, a);
    printf("%f\n", result);
}
```

(2) [5pt]
```
int i;
char command[] = "%7s\n";
char star[] = "*******";
for (i = 7; i > 0; i-=2) {
    star[i] = 0;
    printf(command, star);
    *(command+1) -= 1;
}
```

(3) [6pt]
```
#include <stdio.h>
void f1 ( int *);
void f2 ( int );
void f3 ( int &);

int main ( )
{
    int b = 2;
    printf("Initially, b = %d\n", b);
    f1(&b);
    printf("After f1, b = %d\n", b);
    f2(b);
    printf("After f2, b = %d\n", b);
    f3(b);
    printf("After f3, b = %d\n", b);
    return 0;
}
```
```
void f1 ( int *b ) {
    (*b) *= 2;
    printf("During f1, b = %d\n", *b);
}

void f2 ( int b ) {
    b *= 3;
    printf("During f2, b = %d\n", b);
}

void f3 ( int &b ) {
    b *= 4;
    printf("During f3, b = %d\n", b);
}
```

(4) [8pt]
```
#include <stdio.h>
int print_series (int);

int main ( )
{
    print_series(3);
    return 0;
}
```
```
int print_series (int x)
{
    int sum;
    printf("f(%d) = ", x);
    if (x > 1) {
        printf("f(%d) + f(%d)\n", x-1, x-2);
        sum = print_series (x-1) + print_series (x-2) ;
        printf("So, f(%d) = %d\n", x, sum);
    }
    else {
        sum = 1;
        printf("%d\n", sum);
    }
    return sum;
}
```

注意：背面有試題

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(5) [5pt]

```
int x;
for (x = 30; x >= 0; x--) {
    if (x%4 == 0) continue;
    if (x%17 == 16) break;
    cout << x << " ";
}
cout << endl << "The final value of x is: " << x
    << endl;
```

(6) [5pt]

```
int number1 = 5;   //number1 = 00000000 00000101
int number2 = 12;  //number2 = 00000000 00001100
int number3;
number3 = 1^((number2^(number1 << 5)) & 15);
number3 = number3 >> 2;
//Assume that the MSB shifted in is 0;
printf("%d\n", number3);
```

(7) [10pt]

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

int scmp ( char *s1, char *s2 ) {
    while ( *s1 != '\0'   &&   *s1 != '\0') {
        if (s1[0] > s2[0])   return 1;
        else if (s1[0] < s2[0])   return -1;
        else {
            s1++;
            s2++;
        }
    }   // end while

    if (*s1 == *s2) return 0;
    else if (*s1 == '\0') return -1;
    else return 1;
}
```

```
int main ( )
{
    int i, size = 4;
    char *hold, *suit[4] =
        {"Hearts", "Diamonds", "Clubs", "Spades"};
    for (int pass = 0; pass < size - 1; pass++) {
        for (i=0; i < size - 1; i++)
            if ( scmp(suit[i], suit[i+1]) > 0) {
                hold = suit[i];
                suit[i] = suit[i+1];
                suit[i+1] = hold;
            }   // end if
        cout << "In round " << pass <<" :\n";
        for (i=0; i< size; i++)
            cout << "s[" << i << "] = " << suit[i] <<endl;
    }   // end for pass
    return 0;
}
```

(8) [10pt]

```
#include <stdio.h>
unsigned short encode(char *);

int main ()
{
    unsigned int i;
    char cube[] = "10-01";
    unsigned short output;
    output = encode(cube);
    printf("encoded output is: ");
    for (i=512; i > 0; i /= 2) {
        if (i & output) putchar('1');
        else putchar('0');
    }   // end for i
    printf("\n");
    return 0;
}
```

```
unsigned short encode(char *input)
{
    unsigned short temp, output = 0;
    int i, j;
    for (i=0; input[i] != NULL; i++) {
        switch( *(input+i) ) {
        case '0':
            temp = 1; break;
        case '1':
            temp = 2; break;
        case '-':
            temp = 3; break;
        default:
            temp = 0;
        }   // end switch
        for (j=0; j<i; j++) temp = temp << 2;
        output = output | temp;
    }   // end for i
    return output;
}
```

IV. [10pt] Write a C/C++ function, using do/while loop, to linearly interpolate 11 equal-space sampled points between (x1, y1) and (x2, y2).

V. [10pt] For an engineer of digital circuit design, it is usual to view the circuit output in hexadecimal format. Please write a C/C++ function to translate a decimal number x10 to hexadecimal format, x16, for comparing the system simulation output with that of digital circuit designed.

注意：背面有試題

VI. [15pt]　What is the output by the following program?

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

class CreateAndDestroy {
public:
   CreateAndDestroy(int);   // constructor
   ~CreateAndDestroy();     // destructor
private:
   int data;
}; // end class CreateAndDestroy

CreateAndDestroy::CreateAndDestroy(int value)
{
   data = value;
   cout << "Object " << data << "     constructor";
} // end CreateAndDestroy constructor

CreateAndDestroy::~CreateAndDestroy()
{ cerr << "Object " << data << "     destructor " << endl; }

void create(void);
CreateAndDestroy first(1);

int main()
{
   CreateAndDestroy third(2);
   create();
   static CreateAndDestroy second(3);
   CreateAndDestroy fourth(4);
   return 0;
} // end function main

// Function to create objects
void create(void)
{
   Static CreateAndDestroy fifth(5);
   CreateAndDestroy sixth(6);
} // end function create;
```

參考用