計算機程式二 112 學年度第 2 學期小考 1 試題

系級：_____學號：_____ 姓名：_____

All programs have "#include <stdio.h>". Each blank is 3%.

1. The output for test01():

(1) Line 1: 1 2 (2) Line 2: 0 3 (3) Line 3: 0 1 2 3

```
void fun(int n) {
   int index = 0;
   while(n>0) {
      if(n&1==1)  printf("%d ", index);
      n = n>>1;
      index++;
   }
   printf("\n");
}
int test01() {
   fun(6);
   fun(9);
   fun(15);
   return 0;
}
```

3. The output for test02():

(1) Line 1: 10, 3, 8 (2) Line 2: 26, 2, 7 (3) Line 3: 27, 66, 8

```
int test02(){
   int i=2,j=7,a=0;
   a=i++ + ++j;
   printf("%d, %d, %d\n",a,i,j);
   a=a+ --i * j--;
   printf("%d, %d, %d\n",a,i,j);
   i=i * (a++ + j++);
   printf("%d, %d, %d\n",a,i,j);
   return 0;
}
```

3. The output for test03(9, 4, 3):

(1) Line 1: 10 16 160 (2) Line 2: 11 4 160

```
void g1(int *a, int b, int *c) {
      b += ++*a + (*c)++;
      *a %= (b--) - (--*c);
      *c = b * (*a);
       printf("%d %d %d\n", *a, b, *c);
}
void test03(int i, int j, int k) {
   g1(&i, j, &k);
   printf("%d %d %d\n", ++i, j--, k++);
}
```

4. The output for test04():

(1) ____76____ (2) ____3e____ (3) ___110100___

```
void g2(int a, int b) {
   for (int i = 1 << (a - 5); i; i = i >> 1) {
      if (b & i) {          printf("1");       }
      else       {          printf("0");       }
   }
   printf("\n");
}
void test04() {
   int a = 012, b = 0x34;
   printf("%o\n", a | b);
   printf("%x\n", a ^ b);
   g2(a, b);
}
```

5. Please describe the errors of the following code.

使用系統保留字命名變數

```
void test05() {                          | 01
   float *ptr;                           | 02
   float float = 100.01f;                | 03
   ptr = &float;                         | 04
   printf("=%0.2f", *ptr);               | 05
}
```

6. The output for test06():

(1) ___3___ (2) ___15___ (3) ___12___ (4) ___20___

```
void test06() {
      int a=2, b=4, c=6, d=8,*ptr1,*ptr2,*ptr3,*ptr4;
      ptr1= &a;
      ptr2 = &b;
      ptr3= &c;
      ptr4=&d;
      c *= (*ptr1)++ ;
      *ptr2=c + *ptr1;
      ptr4++;
      d+=*ptr2 - *ptr1;
      printf("%d\n", *ptr1); // (1)
      printf("%d\n", b);      //  (2)
      printf("%d\n",*ptr3); // (3)
      printf("%d\n", d);      //  (4)
}
```

7. Please describe the errors of the following code

指標初始值(記憶體位址)錯誤設定。

```
void test07() {                          | 01
   int x=100, *p;                        | 02
   *p=150;                               | 03
    x=*p;                                | 04
   printf("%d", x);                      | 05
}
```

8. Please trace the program and fill the blanks with correct statements.

(1) *out==3 (2) (*score)++; (3) input

output

```
3
0 0 0
```

```
void base(int *score, int *state, int *out, int input) {
   if(input==0) {
      (*out)++;
      if(___(1)___)  {          *state = 0;       }
   }
   else if(input==4) {
      ___(2)___
      if(*state==7)   {          (*score) += 3;       }
      else if(*state==6||*state==5||*state==3){(*score)+= 2;}
      else if(*state==4||*state==2||*state==1){(*score)+= 1;}
      *state = 0;
   }
   else {
      *state = ((*state)<<___(3)___) | (1<<(input-1));
      if(*state > 7) {
         int temp = (*state)>>3;
         if(temp==7) {              (*score) += 3;          }
         else if(temp==6||temp==5||temp==3){(*score)+= 2;}
         else if(temp==4||temp==2||temp==1){(*score)+= 1;}
      }
   }
   *state = (*state)&7;
}
int main() {
   int score=0, state=0, out=0;
   base(&score, &state, &out, 1);
   base(&score, &state, &out, 3);
   base(&score, &state, &out, 4);
   base(&score, &state, &out, 0);
   base(&score, &state, &out, 2);
   base(&score, &state, &out, 0);
   base(&score, &state, &out, 0);
   printf("%d\n", score);
   printf("%d %d %d\n",state&1,(state>>1)&1, (state>>2)&1);
   return 0;
}
```

9. Please trace the program and fill the blanks with correct statements.

(1) ___float__ (2) ____*c 或 *temp2____ (3) ___&temp___

The output:	3, 6, -11 -11 17, 6

```
void f09(float *a, int *b, float *c){
    __(1)___temp = *a;
    float* temp2=c;
    *a = (*b) + (*c);
    ____(2)____= (*b)  - (*a);
    a = ____(3)_____  ;
    (*a)++;
    printf("%0.0f, %d, %0.0f\n", *a, *b, *c);       // Line 1
    printf("%0.0f\n", *temp2);                      // Line 2
}
void test09(){
    int j = 6;
    float i=2.0f,k= 10.5f;
    f12(&i, &j, &k);
    printf("%0.0f, %d\n", i, j);                    // Line 3
}
```

10. Please trace the program and fill the blanks with correct statements.

(1) _____…_____ (2) _____len_____ (3) ___va_end____

output	1.1 0.1 0.2 0.3

```
#include <stdio.h>
#include <stdarg.h>
void foo(int len,___(1)___) {
    va_list args;
    va_start(args, ___(2)___);
    for(int j = 0; j < len; j++) {
        printf("%.1f\n", va_arg(args, double));
    }
    ___(3)___(args);
}
int main() {
    double x = 1.1, a = 0.1, b = 0.2, c = 0.3;
    foo(1, x);
    foo(3, a, b, c);
    return 0;
}
```

11. Please trace the program and fill the blanks with correct statements.

(1) ASSERT_EQ (2) mul (3) RUN_ALL_TESTS

```
#include <cstdlib>
#include <gtest/gtest.h>
int mul( int a , int b ) {
    return a * b ;
}
TEST( multest , HandleNoneZeroInput ) {
    ____(1)___(21 , ___(2)___ ( 3 , 7 ) ) ;
    ____(1)___(-24, ___(2)___ ( -6 , 4 ) ) ;
}
int main( int argc , char **argv ){
    testing :: InitGoogleTest( &argc , argv ) ;
    return ___(3)___( ) ;
}
```

15. 針對第一次團體作業，請簡要說明討論狀況與結果。(30 字含以上才計分) For the first group assignment, please briefly describe the status and results of the group discussion (30 words or more will be graded)

12. Please describe the two definitions.

Line coverage:

用來衡量測試過程中已執行的可執行程式碼語句的百分比。它指示測試案例覆蓋了多少個單獨的程式碼語句。

Branch coverage:

用來衡量測試期間已執行的程式碼中分支的百分比。側重於程序的控制流程，旨在確保所有可能的分支都經過測試。

13. Please design test cases so that "Branch coverage" reaches 100%.

```
char grade(int score) {
    if(score >= 100)     {      return 'N';    }
    else if(score > 90)  {      return 'A';    }
    else if(score > 80)  {      return 'B';    }
    else if(score > 70)  {      return 'C';    }
    else if(score >= 60) {      return 'D';    }
    else                 {      return 'N';    }
}
```

Input	Output
grade(101);	N
grade(100);	N
grade(95);	A
grade(85);	B
grade(75);	C
grade(65);	D
grade(60);	D
grade(55);	N

14. Please design test cases according to the problem description to satisfy all case.

使用者需要輸入身高(m)和體重(kg)，去計算 BMI 值，BMI 公式=體重(kg)/身高(m)/身高(m)，BMI 值>=24 時，輸出"too high"，BMI 值<=18 時，輸出"too low"，其餘情況為正常值

The user needs to input height (m) and weight (kg) to calculate the BMI value. The BMI formula = weight (kg)/height (m)/height (m). When the BMI value >= 24, "too high" is output. When the BMI value is <=18, "too low" is output, and the rest of the cases are normal values.

Input	Output
BMI(1.6, 90);	too high
BMI(2.1, 70);	too low
BMI(2, 80);	20

16. 請針對此課程，提出目前學習上較有問題的部分，並說明如何解決問題。(30 字含以上才計分) (For this course, please point the more confusing section. Write down the problem and how to improve it. (30 words or more will be scored)