一	二	三	四	五	六	七	八	总分	阅卷人签名

I. Choose the right unique answer (3points * 15, total 45 points)

1. What will be the output of the program?

```c
#include<stdio.h>
int main(){
  int i=2;
  int j = i + (1, 2, 3, 4, 5);
  printf("%d\n", j);
  return 0;
}
```

A. 4　　B. 7　　C. 6　　D. 5

2. What will be the output of the program?

```c
#include<stdio.h>
int main(){
    char str1[] = "Hello";
    char str2[] = "Hello";
    if(str1 == str2)
        printf("Equal\n");
    else
        printf("Unequal\n");
    return 0;
}
```

A. Equal　　B. Unequal　　C. Error　　D. None of above

3. What does the declaration `char *arr[10];` signify?

A. **arr** is a array of 10 character pointers.
B. **arr** is a array of function pointer.
C. **arr** is a array of characters.

D. **arr** is a pointer to array of characters.

4. Which of the following is the correct usage of conditional operators used in C?

   A. `a>b ? c=30 : c=40;`
   B. `a>b ? c=30;`
   C. `max = a>b ? a>c?a:c:b>c?b:c`
   D. `return (a>b)?(a:b)`

5. Input/output function prototypes and macros are defined in which header file?

   A. `conio.h`   B. `stdlib.h`   C. `stdio.h`   D. `dos.h`

6. In C, what is the correct precedence order of operators?

   A. `* != <= +=` B. `!= += * <=` C. `* <= != +=` D. `!= += <= *`

7. What is the output of the following program?

```
#include<stdio.h>
main(){
    int a[3] = {2,1};
    printf("%d", a[a[1]]);
}
```

   A. 0   B. 1   C. 2   D. 3

8. How do you specify double constant 3.14 as a long double?

   A. By using LD after 3.14
   B. By using L after 3.14
   C. By using DL after 3.14
   D. By using LF after 3.14

9. A Variable name in C includes which special symbols?

   A. * (asterisk)   B. # (Hash)   C. + (Addition)   D. _ (underscore)

10. What is the output of the below code snippet?

```
#include<stdio.h>
main(){
    for(1;2;3)
        printf("Hello");
}
```

   A. Infinite loop B. Prints "Hello" once.   C. No outputD. Compile error

11. Given char a[]="XYZ", b[]={'X','Y','Z'};, which of the
following statements is correct?

 A. Array **a** has the same length as array **b**
 B. The length of array **a** is less than the one of array **b**
 C. The length of array **a** is greater than the one of array **b**
 D. None of the above statements is correct.

12. Given the following code, the binary value of z is:

```
char x=3,y=6,z;
z=x^y<<2;
```

 A. 00110100   B. 00011011   C. 00011100   D. 00011000

13. Given int x=0,*p=&x;, the output of the statement
printf("%p",&p); is:

 A. 0   B. address of **x**   C. random number   D. address of **p**

14. Given char a[]="ABCD",*p=a;, the value of * (p+4) is:

 A. "ABCD"   B. 'D'   C. '\0'   D. random value

15. Given an enumerate definition

```
enum color {red, green, yellow=5, white, black};
```

The values of the elements from **red** to **black** in the enumerate type
color is:

 A. 1, 2, 3, 4, 5   B. 0, 1, 2, 3, 4   C. 0, 1, 5, 6, 7   D. 3, 4, 5, 6, 7

II. Judge if the statement is correct (1 points * 10, total 10 points)

 1. A macro must always be defined in capital letters.

 2. A variable declared by keyword **extern** can be accessed by the code in
 different files.

 3. The output of printf("%f",(float)(1/2)); is 0.500000.

 4. The first argument of main(int argc, char* argv[]) is the
 number of arguments following the command complied from the program.

 5. The value of a variable declared by keyword static inside a function cannot
 be modified.

 6. Spppose int nums[10];, then nums[i] has the same effect as
 *(nums + i).

 7. A function name can also be used as an argument of another function.

8. A string constant is essentially an array of characters.

9. Suppose `int i=10;`, the value of expression `i++` is `10`.

10. Suppose `int i=1;`, after `if(!i<=1){i--;}`, the value of `i` is `0`.

III. Fill the blanks in the program (3 points * 5, total 15 points)

1. The following program is used to output those integers between 1 and 500 that can be divided by 6.

```c
int main(){
  int n;
  for(n=1,n<=500;n++){
    if(n%6 != 0){

      _____ ;
    }
    printf("%d\n",n);
  }
  return 0;
}
```

2. The following program is used to output all the numbers in the array.

```c
int main(){
  int a[10]={0,1,2,3,4,5,6,7,8,9};
  int *p;
  for(p=a,p<=_____;p++){
      printf("%d\n",*p);
  }
  return 0;
}
```

3. Define a macro to calculate the area of a circle

```c
#define PI 3.1415936
#define AREA(r) _____
int main(){
  float r=5;
  printf("%f",AREA(r));
}
```

4. Calling `swap()` function

```c
void swap(int *m, int *n){
  int tmp;
  tmp=*m;
  *m=*n;
  *n=tmp;
```

```
}
int main(){
  int a=10,b=20;
  swap(_____);
  printf("a=%d,b=%d\n",a,b);
  return 0;
}
```

5. Count the number of characters in file abc.txt

```
#include <stdio.h>
int main(){
  FILE *fp;
  int count=0;
  _____;
  while(fgetc(fp)!=EOF){
    count++;
  }
  printf("%d\n",count);
  return 0;
}
```

IV. Write C programs to solve given problems (total 30 points)

1. Write a C program to calculate $1! + 2! + \ldots + 10!$ (10 points)

2. Write a C program to read a string with at most 100 characters and output the numbers of non-negative numbers, negative numbers and float numbers in the string (20 points)

   Sample:

   Input: 1a-2.0b3.4c5-6d7

   Output: 4, 2, 2

Problem I. Choose the correct answer.

 (20 points, 2 points for each question)

   1. Which one of the following is not a valid identifier in C ?
      (A) hello_world (B) abc100 (C) zhang3   (D) 2u

   2. Which of the following cannot be used to store the string "Mary"
   into nameStr?
      (A) char nameStr[5] = "Mary";
      (B) char nameStr[5];   nameStr = "Mary";
      (C) char nameStr[] = "Mary";
      (D) char nameStr[5];   strcpy(nameStr, "Mary");

   3. Given that x is a float variable and num is an int variable
   containing the value 5, what will x contain after execution of the
   following statement:
         x = num + 2;
     (A) 7   (B) 7.0   (C) 5
     (D) 5.0 (E) nothing;a compile-time error occurs

   4. Given the declaration: char message[10];
     which of the following statements is invalid?
     (A) strcpy(message, "Welcome");
     (B) message[2] = 'g';
     (C) if (strcmp(message, "Picnic") = = 0) printf("true\n");

(D) none of the above--they are all valid

5. Which of the following stores into min the smaller of alpha and beta?
  (A) if (alpha < beta) min = alpha; else   min = beta;
  (B) min = (alpha < beta) ? beta : alpha;
  (C) min = (alpha < beta) ? alpha : beta;
  (D) A and B above
  (E) A and C above

6. An int variable someInt contains a value from 0 to 9. Which of the following stores the corresponding digit character into someChar?
  (A) someChar = char('0' + someInt);
  (B) someChar = char(someInt);
  (C) someChar = someInt;
  (D) someChar = char('0' - someInt);
  (E) someChar = char(someInt - '0');

7. Given the declarations
      enum Days {YESTERDAY, TODAY, TOMORROW};
      Days day = TODAY;
  what is the value of the expression int(day) ?
  (A) TODAY   (B) 1   (C) TOMORROW
  (D) 2   (E) none of the above

8. Which of the following statements about global variables is true?
   (A) A global variable is accessible only to the main function.
   (B) A global variable is declared in the highest-level block in which it is used.
   (C) A global variable can have the same name as a variable that is declared locally within a function.
   (D) If a function contains a local variable with the same name as a global variable, the global variable takes precedence.

9. Although the expression: 34 + 'A' - 65.84

is not likely to be used by a programmer, it is valid in C.
What is the data type of the expression?
   (A) char   (B) int   (C) long   (D) double

10. Does the following Switch statement cause a compile-time error?
    (n and alpha are of type int.)
    switch (n)
    {
       case 6 : alpha = 10; break;
       case 2 :
       case 5 : alpha = 20; break;
       case 8 :
       case 2 : alpha = 30;
    }
   (A)Yes--one or more break statements are missing.
   (B) Yes--there are duplicate case labels.
   (C) Yes--the data types of the case labels are not valid.
   (D) Yes--the default label is missing.
   (E) No.

Problem II Answer questions.
  （**30 points, 3 points for each question**）
  1. What is the value of the expression Test (4)?
      void Test(int i)
      {
            if (i < 8)
            {
               Test(i + 1);
               Printf("%d ",i);
            }
      }

  2. After execute the following code, what is the value of variable
      alpha?
      int num;

```
  int alpha = 10;
  num = 4;
  switch (num)
  {
    case 3  : alpha++;
    case 4  : alpha = alpha + 2;
    case 8  : alpha = alpha + 3;
    default : alpha = alpha + 4;
    }
```

3. The result of expression 6.5+22%4 is _____

4. What is the output of the following code fragment?
    (All variables are of type int.)
```
    limit = 8;
    printf("A");
    loopCount = 6;
    do
    {
       printf("B");
       loopCount++;
    } while (loopCount <= limit);
    printf("ED");
```

5. Consider the function definition, and after the funcation call :
```
    int a=10,b=20;  DoThis(a,&b);
     void DoThis( int alpha, int *beta )
     {
       alpha = alpha + 50;
       beta = alpha + beta;
     }
```
   What is the value of a and b?

6. char *p1,*p2;
    p2="hello";
   strcpy(p1,p2);
```
```

What wrong with the code?

7. int a[5][6]; *(a+2)+3 is _____.

8. What is the output of the following code?
   ```
   int alpha = 3;
   int beta = 20;
   if (beta > 10)
   {
     int alpha = 5;
     beta = beta + alpha;
     printf("%d  %d\n",alpha,beta);
   }
   printf("%d  %d\n",alpha,beta);
   ```

9. struct date{
   ```
     int month;
     int day;
   }d1,d2;
   // input the value of d1 and d2 from keyboard.
   ```
   Please write code to output the comparison result of d1 and d2
   that is if d1 is early than d2 output -1; if d2 is early than d1
   output 1; if d1 equals to d2 output 0.

10. Please use malloc function in c language to produce an integer
    array with 10 elements.

Problem III Define functions.（25 points）

1. (12 points)

In arithmetic, the least common multiple (LCM) of two integers *a* and
b, usually denoted by LCM (*a*, *b*), is the smallest positive integer that
is divisible by both *a* and *b*. For example, the LCM of 4 and 6 is 12.
Define a function to compute the least common multiple of n integers
a_1, a_2…, a_n （$1 \le a_1$, a_2…, $a_n \le 100, 1 \le n < 10$）.

Function prototype:

long long int LCM(int a[ ],int n);

/* Precondition: a is an array, storing n integers

   Postcondition: the least common multiple of n integers a_1, a_2..., a_n.

*/

2. (13 points)

Define a function to counting how many integer numbers in a given string. Note that a sequence of consecutive digit numbers is considered one. For example, string "12a34b56.7" has four integer numbers. A length of a string is not greater than 100 characters.

Function prototype:

int count_int(char input[]);

/* Precondition: input is an array, storing a string

   Postcondition: integer numbers in a string

*/

Problem IV Write Program.（25 points）

Write a program to count occurrences(出现次数) of each different word in a file, sort according to the description, and write the result to another file. Filenames are specified in the command line.
1、Format of the command line: cmd inputFile outputFile
2、Sorting criteria: from most frequent word to rare one. If two words have same occurrences, they are outputted in lexicographical order.
3、Input file size limitation: 10K
4、Output file format: "word: occurrences" for each word in each line.

For example:
an input file a.txt :
   ass sdwd ssd ssda wqw ass
   ass as a aa a a aa a a a
command line: cmd a.txt b.txt
output file b.txt:

```
a: 6
ass: 3
aa: 2
as: 1
sdwd: 1
ssd: 1
ssda: 1
wqw: 1
```