Mid Term self test

Name (Chinese): Name (English):
Student #:

1. Explain: What is:

   a.) a in: **double *a;** 5pts

   b.) b and c in:

```
typedef struct {float a;float b;} my_struct_t;
```

5pts

```
my_struct_t b, *c;
```

2. Write down an example of
   a.) for a "for" loop 5pts

   b.) do -while loop 5pts

   c.) while loop 5pts

3. What output do you expect from the following code? 6pts

```
if (1&2)    printf("1: true\n"); else printf("1: false\n");
if (1^1)    printf("2: true\n"); else printf("2: false\n");
if (1&&2)   printf("3: true\n"); else printf("3: false\n");
```

4. Make your own function that takes n as an argument and returns the nth Fibonacci number. Fibonacci numbers are 1, 1, 2, 3, 5, ..., where the nth Fibonacci number is

$$f_n = f_{n-1} + f_{n-2}$$

   a) As a recursive function: 8pts

```
int my_fibonacci (int x)
{
        int y;
    // PUT YOUR CODE HERE!
        return y;
}
```

   b) As a iterative function that is not recursive (loops, the function does not call itself): 8pts

```
int my_fibonacci (int x)
{
        int y;
       // PUT YOUR CODE HERE!
        return y;
}
```

5. Consider the following code sample:

==========

```
struct my_struct {double f,g,d; int aa,b;};
struct your_struct {float a; double b;};

int main()
{
    if (sizeof(struct my_struct)==sizeof(struct your_struct)) printf ("1:      true\n");
    else printf ("1:       false\n");

    if (sizeof(struct my_struct *)==sizeof(struct your_struct *)) printf ("2:        true\n");
    else printf ("2:       false\n");
}
```

==========

Please write down the expected output! 6pts

6. Consider the following code:

```
#include "string.h"

 int main()
 {
  char a[35]="How are you?";
  char b[35]="Hello! ";
  char c[70];

            // Put your code here
 }
```

Please make an example of a program that copies the contents of string a and b into c.
Any method that works independent from how a and b are initialized and does not need any other functions than provided by string.h is allowed! 5pts

7. How is the end of a string indicated in C? 4pts

8. What is the output of the following program?

```
    void  recursive_f(int i)
    {
       if  (i==0) return;
       printf ("(begin) now i is: %d\n", i);
        recursive_f (i-1);
       printf ("(end) now i is: %d\n", i);
       return;
```

```
}
 int main()
{
    recursive_f(2);
 }
```

(please fill in the expected output over _____)

(begin) now i is: _____ 12pts
(begin) now i is: _____
end) now i is: _____
end) now i is: _____

9. Look at the following program:

==========

```
//#define MMACRO
#if defined(MMACRO)
#define MY_VAL 180
#else
#define MY_VAL 160
#endif

int main()
{
    printf("Constant val: %d \n",MY_VAL);

}
```

==========

a) Please fill in the expected output:

Constant val: _____ 5pts

b) In case you uncomment the 1st line to
#define MMACRO
Please fill in the expected output:

Constant val: _____ 5pts

10. Explain the meaning of **sizeof(...)** 5pts

11. The code below defines a simple linked list:

```
#include <stdlib.h>

struct my_struct_s
{
int a,b;
struct  my_struct_s *next;
};
```

```
struct my_struct_s a[30];

void print_data(struct my_struct_s *first)
{
  printf("%d \n",(*first).a);
  if ((*first).next != 0)
        print_data((*first).next);
};

int main()
{
   int i;

   for (i=0;i<30;i++){

      a[i].a=i*100;
      if (i>0) a[i-1].next=&a[i];
   }
   a[29].next=0;

           // Your Code comes here

    print_data(a);
}
```

What code has to be added in order to change the sequence of the linked list in that way that

First the elements 1-9 are printed, then the elements 20-29, finally the elements 10-19? 12 pts