Total Marks: 60

1. **(16)** Given the following declaration: `int i, *p, *q;` write the **C** statements / code for each of the following:
   a. Set `p` to point to the integer variable `i` .
   b. Print the integer value that `p` points to.
   c. Print the value of `p`.
   d. Print the address of `p`.
   e. Make `p` point to the same location that `q` is pointing to.
   f. Set the variable that `p` is pointing to contain the same integer value as the variable that `q` is pointing to.
   g. Check if `p` and `q` are pointing to the same variable.
   h. Interchange `p` and `q`, i.e., `p` should point to what `q` was pointing to and vice versa.

2. **(10)** Write a function `swap` with four parameters: an integer array `a`, and three integers `i`,`j` and `n`. It works as follows: It first checks that the two ranges `{i .. i+(n-1)}` and `{j .. j+(n-1)}` are disjoint. If they intersect, the function does nothing else and returns `0`. If the ranges are disjoint, it swaps the contents of the first range of items in `a`, with the second range of items in `a` and it returns `1`.

3. **(2)** What does the following loop do: `while ( *(s++) = *(t++) ) ;` if `s` and `t` are declared as character pointers.

4. **(4)** What does the following function output when called as foo(4); :
```
void foo(int n){
        int i=0;
        if (n==0)
                return;
        for(i=0;i<4-n;i++) printf(" ");
        for(i=0;i<n;i++) printf(".");
        foo(n-1);
}
```

5. **(6)** What does the following program output when executed:
```
#include <stdio.h>
int x=0,y=0;
void foo(int x) {
        int y;
        x=1; y=1;
}
void goo(int x) {
        int y=2;
        x=2;
        { extern x,y;
            x=3; y=3;
         }
}
```

```
main() {
        printf("1. x=%d,y=%d\n");
        foo(y);
        printf("2. x=%d,y=%d\n");
        goo(y);
        printf("3. x=%d,y=%d\n");
}
```

6. **(6)** You have written a correct program in the file **bloop.c** . You do the following:

   (a) Create a file **bloop.s** by **gcc –S bloop.c**

   (b) Create a file **bloop.o** by **gcc –c bloop.c**

   (c) Create a file **a.out**   by **gcc   bloop.c**

   In the case of each of these files, what does the file contain and is it human readable?

7. **(8)** Write a function **get_student**. It takes *two* parameters and reads into them a student's *name*(a character string of length at most 30) and *age* (an integer).

   Write a **main** function to read a sequence of 50 student names and ages into two arrays: **names** and **ages**.

8. **(8)** For each case mention true or false:

   a. Pointers contain addresses. Two different pointers cannot contain the same address.

   b. Variables contain values. Two different variables cannot have the same address.

   c. If **a** is defined as an array and **p** is defined as a pointer, then **a=p;** is a valid statement.

   d. If **a** is defined as an array and **p** is defined as a pointer, then **p=a;** is a valid statement.

   e. Each invocation of a function creates new instances of local variables.

   f. Each invocation of a function creates new instances of global variables.

   g. For the declaration **char str[10];** then **str[0]=65; str[1]=66; str[2]=0; printf("%s",str);** would print a valid human readable string.

   h. If **int *p;** is a declaration, then ***p=20;** will always work.