

1. Give the complete output of each of the following C programs. If a program doesn't print any output write "none", and if it prints output infinitely give the first three lines of output and then write "infinite".

a. `#include <stdio.h>`

```
int main() {
    int i= 3, j= 6;
    while (i + j) {
        printf("%d %d\n", i, j);
        j -= i;
    }

    return 0;
}
```

b. `#include <stdio.h>`

```
int main() {
    int a= 4, b= 7;

    if (a)
        printf("test1\n");
    if (!b)
        printf("test2\n");
    if (a || !b)
        printf("test3\n");
    if ((a < b) != (a == b))
        printf("test4\n");

    return 0;
}
```

2. Consider each of the following `while` loop outlines, where *stmts*₁ and *stmts*₂ represent arbitrary statements (we don't know what they are), and `a` and `b` are declared of type `int`, and `done` is an `int` variable with value 0.

Determine the following:

- Which loops will quit before the next iteration if `a` becomes equal to `b` in *stmts*₁?
- Which ones will quit before the next iteration if `a` becomes equal to `b` in *stmts*₂?
- Which ones will execute *stmts*₂ before quitting if `a` becomes equal to `b` in *stmts*₁?

1)

```
while (!done) {
    stmts1
    if (a == b)
        done= 1;
    stmts2
}
```

3)

```
while (a != b) {
    stmts1
    if (a == b) {
        stmts2
    }
}
```

2)

```
while (1) {
    stmts1
    if (a == b)
        break;
    stmts2
}
```

4)

```
while (a != b) {
    stmts1
    stmts2
}
```

3. Consider the following program, composed of two different source files `file1.c` and `file2.c`. Give its complete output.

```
file1.c
#include <stdio.h>

void fn(void);

extern int a;
static int b= 1;

int main() {
    printf("%d %d\n", a, b);
    fn();
    printf("%d %d\n", a, b);
    fn();
    printf("%d %d\n", a, b);

    return 0;
}
```

```
file2.c
#include <stdio.h>

int a= 2;
static int b= 3;

void fn(void) {
    int m= 4;
    static int n= 5;

    printf("enter fn: %d %d %d %d\n", a, b, m, n);
    a= 6;
    b= 7;
    m += 8;
    n += 9;
    printf("leave fn: %d %d %d %d\n", a, b, m, n);
}
```