Sample questions [can be considered as half of the exam]
This question should be solvable in half an hour.
Total marks 50

Closed book; no Internet;
You have to answer all questions. No alternative questions.

PART A: 5 (short or Multiple choice questions) \(5 \times 4 = 20\) marks

(1) Assuming a program is always supplied with at least one command-line argument, which of the following expressions returns the last command-line argument supplied?

A. `argv[0]`
B. `argv[1]`
C. `argv[argc-1]`
D. `argv[argc]`
E. `argv[argc+1]`

(2) Consider the following program stub:
```c
int a;
extern int b;

void f2(int c)
{
    static int d;
    int e;
    ...  
    << X >>
}

void f1()
{
    static int f;
    int g;
    ...
    f2(g);
}

int main(int argc, char *argv[])
{
    f1();
    return 0;
}
```

At the point marked `<< X >>` in the code, which variables are in scope?
A. Variables `a`, `c`, and `e` only.
B. Variables `a`, `b`, `c`, and `e` only.
C. Variables `a`, `c`, `d`, and `e` only.
D. Variables a, b, c, d, and e only.
E. None of the options A to D.

(3) Consider the following function:

```c
void go(void)
{
    for (int i = 0; i < 3; i++){
        for (int j = 5; j > i; j--){
            printf("*");
        }
        printf("!\n");
    }
}
```

What is printed when the go function is executed?
A.  *
    **!
    ***!
B.  **!
    ***!
    ****!
C.  ***!
    **!
    *
D.  ****!
    ***!
    **!
E. None of the options A - D.

(4) Consider the following function:

```c
void go(void)
{
    char str[50];
    strcpy(str, "stringstring");
    str[strlen(str)] = str[0];
    printf("The length of str = %d\n", strlen(str));
}
```

What is printed when the go function is executed?
A. The length of str = 6
B. The length of str = 7
C. The length of str = 50
D. The output is indeterminate in the sense that it can vary from program invocation to program invocation.
E. The function will generate a run-time error

(5) Consider the following program:

```c
#include <stdio.h>

int a;
void go(void)
{
    int b;
    a = a + 1;
    b = b + 1;
    << X >>
}

int main(int argc, char *argv[])
{
    go();
    return 0;
}
```

At the point marked << X >> in the code, what are the values of the variables \(a\) and \(b\)?

A. Both variables \(a\) and \(b\) are definitely 1.
B. Variable \(a\) is definitely 1; variable \(b\) may have any value.
C. Variable \(a\) may have any value; variable \(b\) is definitely 1.
D. Both variables \(a\) and \(b\) may have any value, but they must have the same value.
E. Both variables \(a\) and \(b\) may have any value, and they need not be the same value.

PART B: 2 Questions 2*15= 30 marks

(Not too) Long Questions – do not worry too much about the syntax or semicolons.

1. Write a C (pseudo) function such that it takes two strings as input arguments, checks if
   the first string is a subset of the second string, returns
   a. A Boolean value to indicate if it was the case or not
   b. If yes, the index number at which the first string appears in the second.

2. From a list of number, find the median and average. (Median is the middle number in a
   sorted list. Please consideration to the fact the array might have odd or event number of
   elements).