Exercise 8

Evaluate the following program. What is the output of the program?

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

#define EXPRESSION (3 * j / k - 2)
#define SET_VARIABLES \
    {                 \
        i = 3;        \
        j = 2;        \
        k = 0;        \
    }

int main(void)
{
    int i = 0, j = 7, k = 6;
    char a = 'A', b = '3';
    int32_t x, y = 3;
    uint32_t z = 32;
    double d;

    x = EXPRESSION;
    printf("A) %d\n", x);

    y -= ((j << 1) & (k >> 1));
    printf("B) %d\n", y);

    x = (!(i && k) || !k) ? k + b : j + b;
    printf("C) %d\n", x);

    a += (b + k--) % 10;
    printf("D) %d\n", a);

    d = (double)j * 100 / --k / 3;
    printf("E) %f\n", d);

    x = -1;
    y = (x < z) ? (k < j < 0) : (b >= a < i);
    printf("F) %d\n", y);

    d = x / z;
    printf("G) %f\n", d);

    i = 4;
    j = -1;
```

```
    k = 0;

    x = i && j && k;
    y = i || j && k;
    printf("H) %d, %d\n", x, y);

    x = i && j || k;
    y = i || j || k;
    printf("I) %d, %d\n", x, y);

    SET_VARIABLES;
    y = ++i || ++j && k++;
    printf("J) %d, %d, %d, %d\n", i, j, k, y);

    SET_VARIABLES;
    y = (123 && --i) ? k++ : ++k;
    printf("K) %d, %d, %d, %d\n", i, j, k, y);

    SET_VARIABLES;
    y = ++i && ++j && k++;
    printf("L) %d, %d, %d, %d\n", i, j, k, y);

    i = 4;
    j = --i;
    k = i--;
    printf("M) %d, %d, %d\n", i, j, k);

    i = -1;
    j = 1;

    i && printf("N) Hello World!\n") && --j;

    ++i && j && printf("O) Hello World!\n");

    i || printf("P) Hello World!\n") || j++;

    j-- || !printf("Q) Hello World!\n") || i++;

    printf("R) %d, %d\n", i, j);

    return 0;
}
```