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CMSC 21 – 2
Lecture 3 Assignment

1. Simplify the given code.

**Given code:**

```
if (age >= 13)
   if (age <= 19)
      teenager = true;
   else
      teenager = false;
else if (age < 13)
   teenager = false;
```

**Simplified code:**

```
if (age >= 13 && age <= 19)
    teenager = true;
else
    teenager = false;
```

**Complete source code:**

```
#include <stdio.h>

int main() {
    /* Variable Declaration */
    int age, teenager, true = 1, false = 0;

    /* Prompt for user's age and store it */
    printf("Enter your age: ");
    scanf("%d", &age);

    /* Simplified code */
    if (age >= 13 && age <= 19)
        teenager = true;
    else
        teenager = false;

    /* Indicate that the program ends here */
    return 0;
}
```

**Explanation**: When the integer *age* is greater than or equal to 13 **AND** *age* is less than or equal to 19, then teenager = **TRUE**. On the other hand, when *age* is less than 13 *or* greater than 19, then teenager = **FALSE**.

**Sample outputs:**
With `printf("%d", teenager);` at the end of the source code for testing.

Test 1 (7 is less than 13, so teenager = FALSE)

```
Enter your age: 7
0
```

Test 2 (13 is equal to 13, so teenager = TRUE)

```
Enter your age: 13
1
```

Test 3 (15 is between 13 and 19, so teenager = TRUE)

```
Enter your age: 15
1
```

Test 4 (19 is equal to 19, so teenager = TRUE)

```
Enter your age: 19
1
```

Test 5 (21 is greater than 19, so teenager = FALSE)

```
Enter your age: 21
0
```

2. A C program that does the following: Enter a two-digit number: 25
Number entered in words: twenty-five

**Complete source code:**

```c
#include <stdio.h> /* Include stdio.h for getting inputs
    and printing outputs properly. */

int main() {
    /* Variable Declaration */
    int first_digit, second_digit;

    /* Ask for a two-digit number input and store it accordingly */
    printf("Enter a two-digit number: ");
    scanf("%1d%1d", &first_digit, &second_digit);

    /* Display output */
    printf("%d%d in words is:", first_digit, second_digit);

    /* Evaluate the 2-digit number */
    switch(first_digit)
    {
    case 0: /* If the first digit is 0 */
        switch(second_digit) /* And if the second digit is 0-9 */
        {
            case 0:printf(" Zero"); break;
            case 1:printf(" One"); break;
            case 2:printf(" Two"); break;
            case 3:printf(" Three"); break;
            case 4:printf(" Four"); break;
            case 5:printf(" Five"); break;
            case 6:printf(" Six"); break;
            case 7:printf(" Seven"); break;
            case 8:printf(" Eight"); break;
            case 9:printf(" Nine"); break;
        }
        break;
    case 1: /* If the first digit is 1 */
        switch(second_digit) /* And if the second digit is 0-9 */
        {
            case 0:printf(" Ten"); break;
            case 1:printf(" Eleven"); break;
            case 2:printf(" Twelve"); break;
            case 3:printf(" Thirteen"); break;
            case 4:printf(" Fourteen"); break;
            case 5:printf(" Fifteen"); break;
            case 6:printf(" Sixteen"); break;
            case 7:printf(" Seventeen"); break;
            case 8:printf(" Eighteen"); break;
            case 9:printf(" Nineteen"); break;
        }
        break;

    /* If the first digit is not 0 and 1 */
    case 2:printf(" Twenty"); break;
    case 3:printf(" Thirty"); break;
    case 4:printf(" Forty"); break;
    case 5:printf(" Fifty"); break;
    case 6:printf(" Sixty"); break;
    case 7:printf(" Seventy"); break;
    case 8:printf(" Eighty"); break;
    case 9:printf(" Ninety"); break;
    }

    /* If the first digit is from 2 to 9 */
    if (first_digit > 1) {
        switch(second_digit) { /* And if the second digit is from 1 to 9 */
            case 1:printf("-one"); break;
            case 2:printf("-two"); break;
            case 3:printf("-three"); break;
            case 4:printf("-four"); break;
            case 5:printf("-five"); break;
            case 6:printf("-six"); break;
            case 7:printf("-seven"); break;
            case 8:printf("-eight"); break;
            case 9:printf("-nine"); break;
        }
    }

    /* Indicate that the program ends here */
    return 0;
}
```

**Explanation**: With instructions, the C program above does the following:

- Asks user for a two-digit number input
- Store the two-digit number in two distinct variables respectively (first_digit, second_digit)
- Two-digit numbers with **0** and **1** as their first digit will get special treatments
- Two-digit numbers that have a number from **2 to 9** as their first digit will also get special treatment with second digit also evaluated.
- Display a meaningful output (from a numerical integer two-digit input to words output)

**Sample outputs:**

Test 1

```
Enter a two-digit number: 07
07 in words is: Seven
```

Test 2

```
Enter a two-digit number: 11
11 in words is: Eleven
```

Test 3

```
Enter a two-digit number: 19
19 in words is: Nineteen
```

Test 4

```
Enter a two-digit number: 77
77 in words is: Seventy-seven
```

Test 5

```
Enter a two-digit number: 99
99 in words is: Ninety-nine
```