Laboratory 03 – **if** statement 26.10.2021

1. [2 points] Write a C program to find maximum between two numbers using `if else`.
a) Declare 2 integer variables: `x,y`.
b) Use the commands below to initialize the variables.

```
printf("Enter values for two different numbers: ");
scanf("%d %d", &x, &y);
```

Function `scanf` - reads data from `stdin` (keyboard) and stores them according to the parameter format `("%d %d")` into the locations pointed by the additional arguments `(&x, &y)`.

c) Print the values read from the keyboard onto the screen, (see Expected Output)
d) Use the `if-else` statement to print the value of the largest variable to the screen.

Test Data :
Input the values of two numbers: 4 5

Expected Output:
1st Number = 4, 2nd Number = 5
5 is maximum

2. [3 points] Write a C program to find the largest of three numbers.
a) Declare 4 integer variables: `z,y,z, max`.
b) Use the commands below to initialize the variables.

```
printf("Enter values for three different numbers: ");
scanf("%d %d %d", &x, &y, &z);
```

c) Print the values read from the keyboard onto the screen, (see Expected Output)
d) Use the if statement and the && operator to check if `x` is the largest number, if so assign it the value of `max`.
e) Use the if statement and the && operator to check if `y` is the largest number, if so assign it the value of `max`.
f) Use the if statement and the && operator to check if `z` is the largest number, if so assign it the value of `max`.
g) Don't use the `else` keyword.
h) Print max onto the screen, (see Expected Output)

Test Data:
Input the values of three numbers: 12 25 52

Expected Output:
1st Number = 12,
2nd Number = 25,
3rd Number = 52.

The 53 is the greatest among three.

3. **[5 points]** Write a C program to check leap year using if else.
a) Declare one integer variable `year`.

b) Use the commands below to initialize the variable.

```
printf("Enter year : ");
scanf("%d", &year);
```

c) Use the following algorithm:

```
If year is exactly divisible by 4 and year is not divisible by 100
or year is exactly divisible by 400 then the year is leap year.
Else year is normal year.
```

Use the logical operators && and `||`.

Fill the gaps.

```
if(.....){
        printf("LEAP YEAR - %d\n", year);
} else {
        printf("COMMON YEAR %d\n", year);
}
```

Leap Years 1800 - 2400

1804 1904 2004 2104 2204 2304
1808 1908 2008 2108 2208 2308
1812 1912 2012 2112 2212 2312
1816 1916 2016 2116 2216 2316
1820 1920 2020 2120 2220 2320
1824 1924 2024 2124 2224 2324
1828 1928 2028 2128 2228 2328
1832 1932 2032 2132 2232 2332
1836 1936 2036 2136 2236 2336
1840 1940 2040 2140 2240 2340
1844 1944 2044 2144 2244 2344
1848 1948 2048 2148 2248 2348
1852 1952 2052 2152 2252 2352
1856 1956 2056 2156 2256 2356
1860 1960 2060 2160 2260 2360
1864 1964 2064 2164 2264 2364
1868 1968 2068 2168 2268 2368
1872 1972 2072 2172 2272 2372
1876 1976 2076 2176 2276 2376
1880 1980 2080 2180 2280 2380
1884 1984 2084 2184 2284 2384
1888 1988 2088 2188 2288 2388
1892 1992 2092 2192 2292 2392
1896 1996 2096 2196 2296 2396
2000 2400

4.**[5 points]** Write a C program to find all roots of a quadratic equation using `if-else`.
Write step by step descriptive logic to find roots of a quadratic equation.
a) Input coefficients of quadratic equation from user. Use scanf. Store it in some variable say `a,b` and `c`.

b) Find discriminant of the given equation, using formula `discriminant = b*b - 4*a*c`.

Compute roots based on the nature of `discriminant`.

c) `If discriminant > 0 then,`
`root1 = (-b + sqrt(discriminant) ) / (2*a) and`
`root2 = (-b – sqrt(discriminant) ) / (2*a)`.

d) `If discriminant == 0 then,`

`root1 = root2 = -b / (2*a)`.

e) `Else if discriminant < 0 then`, roots are complex numbers.

f) Print `roots` onto the screen, (see Expected Output)

Test Data: 1 5 6
Expected Output :
Roots are real.
Root1= -2.00
Root2= -3.00

Test Data: 1 5 7
Expected Output:
Roots are complex.
No real solution.

5. **[5 points]** Write a C program to sort four numbers using only five comparisons (`if`).
Use `swap` code from Lab 02. Use the `printf` and `scanf` functions in the program.

Use the following algorithm:

```
Declarations and initializations
First if
      First swap code
Second if
      Second swap code
Third if
      Third swap code
Fourth if
      Fourth swap code
Fifth if
      Fifth swap code

Print the result
```

Test Data: 1 5 7 3
Expected Output: 1 3 5 7

Next time:
Laboratory 04 – if, switch, for, while, do-while.