
Tutorial - Week 3

Objectives: To practice with

- Relational and logical operators
- if...else and switch selection statements

1. Suppose integer variables $x=3$, $y=0$, $z=-4$, what is the value of each of the following expressions true or false?

- a. $x \geq 0 \ \&\& \ y \leq 0$
- b. $x \neq y \ || \ x \neq z$
- c. $++x > 3 \ \&\& \ y++ == 0$
- d. $!(x \neq y)$
- e. $x > 0 \ \&\& \ 'B' < 'A'$

Answer:

Answer:

Answer:

Answer:

Answer:

2. What is Short-Circuit Evaluation? Evaluate the following expressions and variables?

```
bool flag;  
int x, y;
```

- a. $x=y=10$;
flag = $x>0 \ || \ y++$;
- b. $x=y=10$;
flag = $x<0 \ \&\& \ --y$;
- c. $x=y=10$;
if($x==10 \ \&\& \ ++y>10$)
flag = true;
else flag= false;

flag =

y=

flag=

y=

flag =

y=

3. Suppose an integer number = 5 What is the output:

- a.

```
if(number < 3)  
    printf("1\n");  
else if(number == 5)  
    printf("2\n");  
else  
    printf("3\n");
```

Answer:

```
b. if(number < 3)
    if(number == 5)
        printf("1\n");
    else
        printf("2\n");
else
    printf("3\n");
```

Answer:

4. Suppose integers $x=0$, $y=0$, $z=1$. What are the values of x , y and z after executing the code:

```
switch ( x )
{
    case 0:  y=2;
            z=3;
    case 1:  y=4;
            break;
    default: z=0;
}
```

Answer:

5. Write an expression to test for each of the following relationships.

- age is from 18 to 21 inclusive.
- water is less than 1.5 and also greater than 0.1.
- year is divisible by 4. (*Hint: Use %.*)
- speed is not greater than 55.
- y is greater than x and less than z.
- w is either equal to 6 or not greater than 3.

6. Write assignment statements for the following:

- Assign a value of 0 to between if n is less than $-k$ or greater than $+k$; otherwise, assign 1.
- Assign a value of 1 to divisor if digit is a divisor of num; otherwise, assign a value of 0, including the case $\text{digit} = 0$.
- Assign a value of 1 to lowercase if ch is a lowercase letter; otherwise, a value of 0.

7. Write an **if** statement that displays an acceptance message for an astronaut candidate if the person's weight is between the values of `opt_min` and `opt_max` inclusive, the person's age is between `age_min` and `age_max` inclusive, and the person is a nonsmoker (`smoker` is false).

8. Implement the following decision table using a nested if statement. Assume that the grade point average is within the range 0.0 through 4.0.

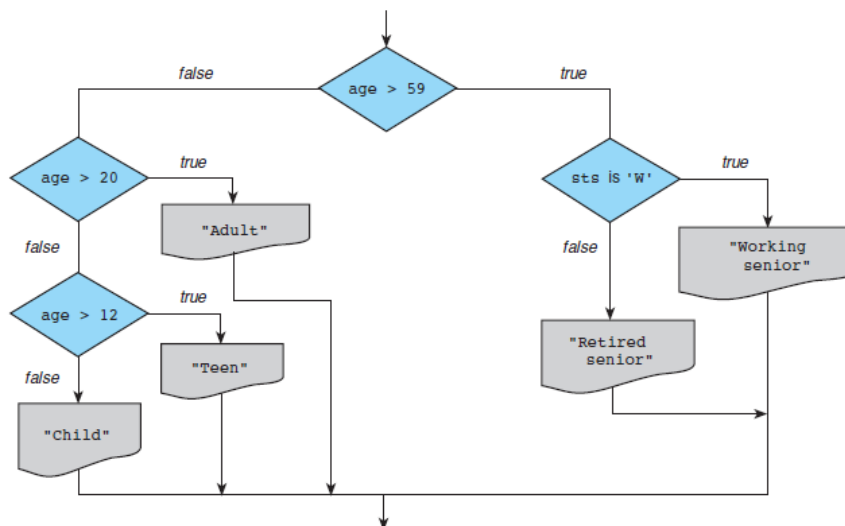
Grade Point Average	Transcript Message
0.0–0.99	Failed semester—registration suspended
1.0–1.99	On probation for next semester
2.0–2.99	(no message)
3.0–3.49	Dean's list for semester
3.5–4.00	Highest honors for semester

9. Write a switch statement that assigns to the variable `lumens` the expected brightness of a standard light bulb whose wattage has been stored in `watts`. Use this table:

Watts	Brightness (in Lumens)
15	125
25	215
40	500
60	880
75	1000
100	1675

Assign `-1` to `lumens` if the value of `watts` is not in the table.

10. Implement the flow diagram in below Fig. using a nested if structure.



11. Write an interactive program that contains an if statement that may be used to compute the area of a square ($\text{area} = \text{side}^2$) or a circle ($\text{area} = \pi \times \text{radius}^2$) after prompting the user to type the first character of the figure name (S or C).