To:
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C LAB WORKSHEET 8_1
C & C++ Selection: if, if-else, if-else-if Part 2

Items in this page:

More Examples And Practices

- In the following example we will experiment with the if statement, which is similar to the for loop because they both test for conditions before doing the execution. Here, the difference between the two is that the for loop is a loop and the if statement is not. We will use a grading system where grades are given in the Table on the right.
- For the following experiments, enter the following **sample input** data line by line, that mean enter each data followed by pressing the return key.

79 91 80 59 100 60 89 45 90

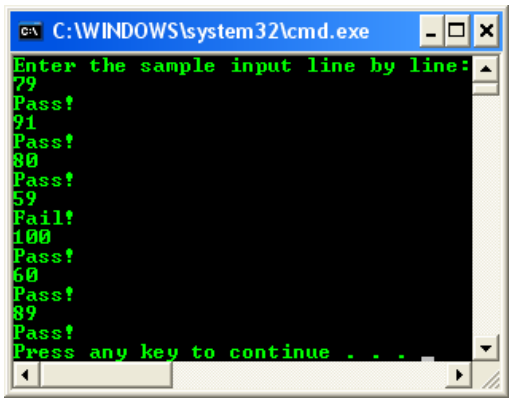
Mark	Grade
0 - 59	F
60 - 69	D
70 - 79	C
80 – 89	B
90 – 100	A

Table 1

1. In the following experiment, if the condition is true, then the Fail! is printed otherwise Pass! is printed. Show the output for the following program.

```
#include <stdio.h>

int main(void)
{
    int i, k;
    printf("Enter the sample input line by line:\n");
    for(i = 1; i <= 7; i = i + 1)
    {
        scanf_s("%d", &k, 1);
        if(k < 60)
            printf("Fail!\n");
        else
            printf("Pass!\n");
    }
    return 0;
}
```

A sample input and output.



a. If the mark is less than 60, what is printed?
b. If the mark is 60 or more, what is printed?

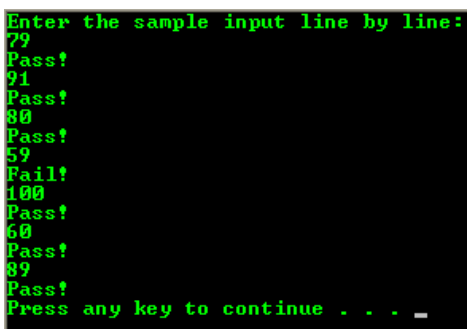
a. Fail!
b. Pass!

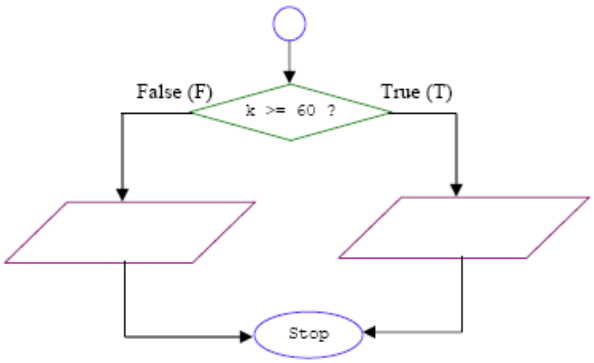
2. In the following code, only < 60 is replaced. Complete the following program and its flowchart so that the output here is the similar to the previous program. No output is necessary here.

```
#include <stdio.h>

int main(void)
{
    int i, k;
    printf("Enter the sample input line by line:\n");
    for(i = 1; i <= 7; i = i + 1)
    {
        scanf_s("%d", &k, 1);
        if(k >= 60)
            _____________________________
        else
            _____________________________
    }
    return 0;
}
```

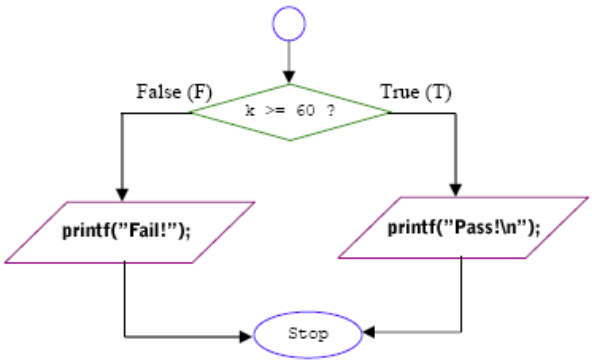
Note: The small circle means a continuation from other part of the full flowchart.

```
if(k >= 60)
    printf("Pass!\n");
else
    printf("Fail!\n");
```





a. If the mark is 60 or more, what is printed?
b. If the mark isn't 60 or more, what is printed?



a. Pass!
b. Fail!

3. One doesn't have to have a matching else and if. However, you could have two consecutive if's. Again, complete the two if's so that the result would be the same as in previous program.

```
#include <stdio.h>

int main(void)
{
    int i, k;
    printf("Enter the sample input line by line:\n");
    for(i = 1; i <= 7; i = i + 1)
    {
        scanf_s("%d", &k, 1);
        if(k >= 60)
            _____________________________
        if(k < 60)
            _____________________________
    }
    return 0;
}
```

```
if(k >= 60)
    printf("Pass!\n");
if(k < 60)
    printf("Fail!\n");
```

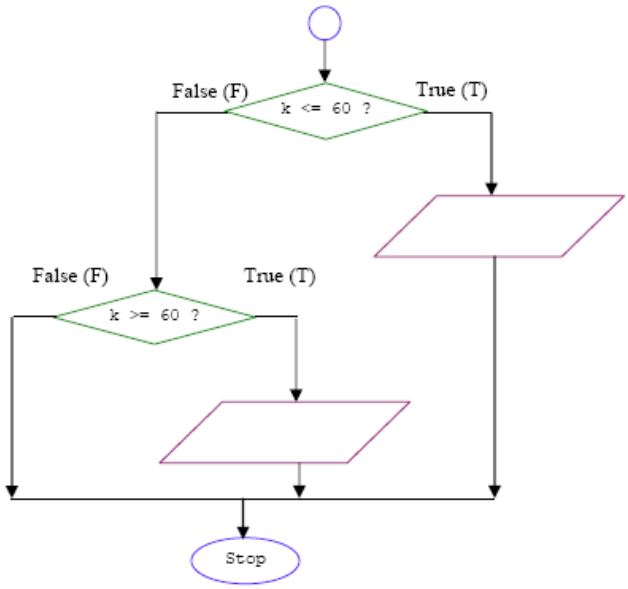
```
Enter the sample input line by line:
79
Pass!
91
Pass!
80
Pass!
59
Fail!
100
Pass!
60
Pass!
89
Pass!
Press any key to continue . . .
```

4. Complete the following two if's in the program and the simplified flowchart so that the output or result will be same as in previous example.

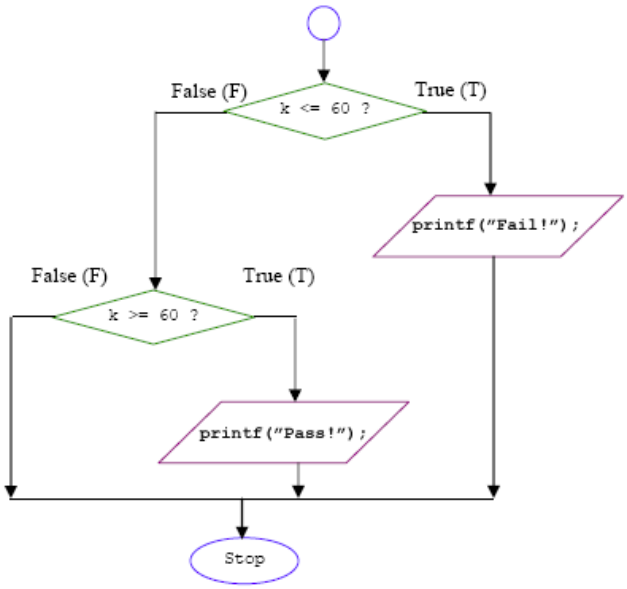
```
#include <stdio.h>

int main(void)
{
    int i, k;
    printf("Enter the sample input line by line:\n");
    for(i = 1; i <= 7; i = i + 1)
    {
        scanf_s("%d", &k, 1);
        if(k <= 59)
            _____________________________
        if(k >= 60)
            _____________________________
    }
    return 0;
}
```

```
if(k <= 59)
    printf("Fail!\n");
if(k >= 60)
    printf("Pass!\n");
```

```
Enter the sample input line by line:
79
Pass!
91
Pass!
80
Pass!
59
Fail!
100
Pass!
60
Pass!
89
Pass!
Press any key to continue . . .
```



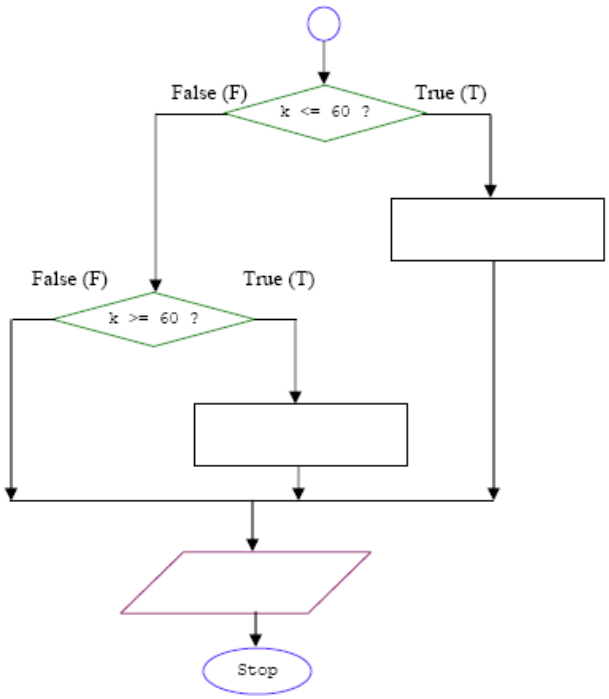
a. Could you replace the second if with simply else?
b. Could you replace the first if with simply else?,



a. Yes.
b. No.

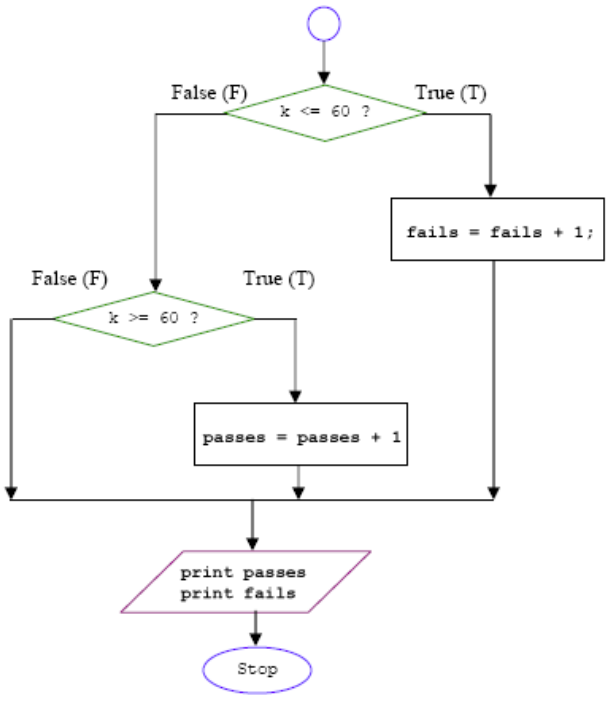
5. In the following example, let count the number of passes and fails. Place passes = passes + 1; and fails = fails + 1; under the proper if's statements and complete the flowchart.

```
#include <stdio.h>

int main(void)
{
    int i, k, passes = 0, fails = 0;
    printf("Enter the sample input line by line:\n");
    for(i = 1; i <= 7; i = i + 1)
    {
        scanf_s("%d", &k, 1);
        if(k <= 59)
            _____________________________
        if(k >= 60)
            _____________________________
    }
    printf("The number of passes = %d\n", passes);
    printf("The number of fails = %d\n", fails);
    return 0;
}
```




```
if(k <= 59)
    fails = fails + 1;
if(k >= 60)
    passes = passes + 1;
```

```
Enter the sample input line by line:
79
91
80
59
100
60
89
The number of passes = 6
The number of fails = 1
Press any key to continue . . .
```



6. In the next experiment, let us see who got 'A' and who didn't. Complete the two if's using either > or <. Remember that those who received 90 or above receive an A. When you try your solution by running it, you should end up with 2 who received A's and 5 who didn't receive A's.

```
#include <stdio.h>

int main(void)
{
    int i, k;
    printf("Enter the sample input line by line:\n");
    for(i = 1; i <= 7; i = i + 1)
    {
        scanf_s("%d", &k, 1);
        if(k_____________)
            printf("It's an A!\n");
        if(k _____________)
            printf("It's not an A!\n");
    }
    return 0;
}
```

a. How would the if's be written if you had used >= and <= instead?

```
if(k > 89)
    printf("It's an A!\n");
if(k < 90)
    printf("It's not an A!\n");
```

```
Enter the sample input line by line:
79
It's not an A!
91
It's an A!
80
It's not an A!
59
It's not an A!
100
It's an A!
60
It's not an A!
89
It's not an A!
Press any key to continue . . .
```

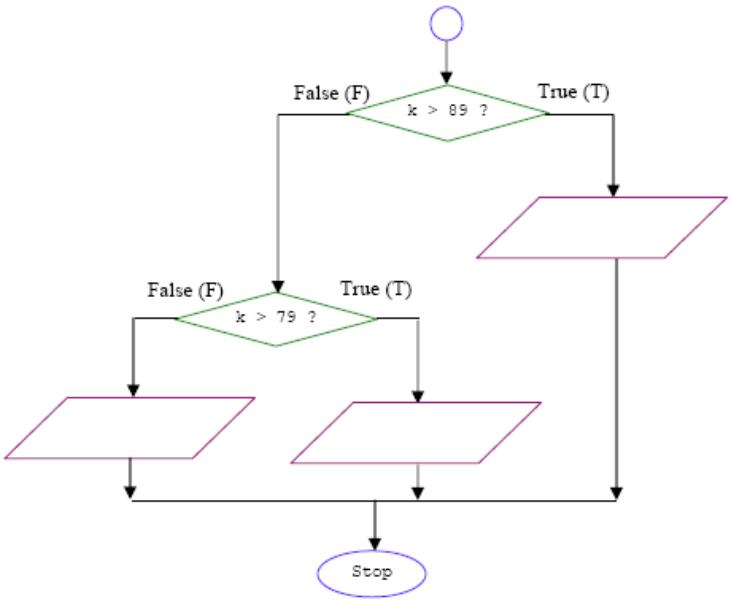
a.
```
if(k >= 90)
    printf("It's an A!\n");
if(k < 90)
    printf("It's not an A!\n");
```

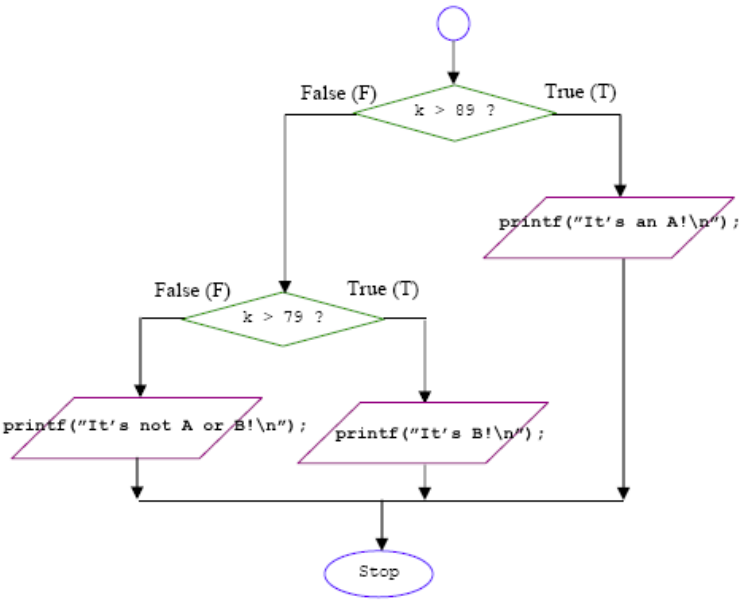
```
if(k <= 89)
    printf("It's not an A!\n");
if(k > 89)
    printf("It's an A!\n");
```

7. You should notice that if k is greater than 89, then an A gets printed. Otherwise, out of those who got less than 90, the next if selects the B's and the final else selects those who received less than 80. Show the output and complete the flowchart for only the if statements.

```
#include <stdio.h>

int main(void)
{
    int i, k;
    printf("Enter the sample input line by line:\n");
    for(i = 1; i <= 7; i = i + 1)
    {
        scanf_s("%d", &k, 1);
        if(k > 89)                      // only A's
            printf("It's an A!\n");
        else if (k > 79)                // non A's, only B's
            printf("It's B!\n");
        else                            // others
            printf("It's not an A or B!\n");
    }
    return 0;
}
```

```
Enter the sample input line by line:
79
91
80
59
100
60
89
A's = 2 B's = 2 Lower = 3
Press any key to continue . . .
```

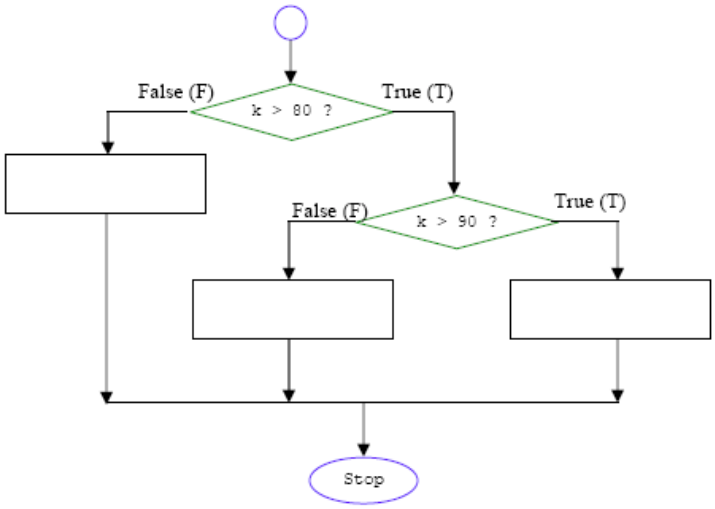




8. The following experiment will count the number of A's, B's and the lower grades. The logic has been rearranged. Complete the flowchart and the program. Place the following three statements properly:

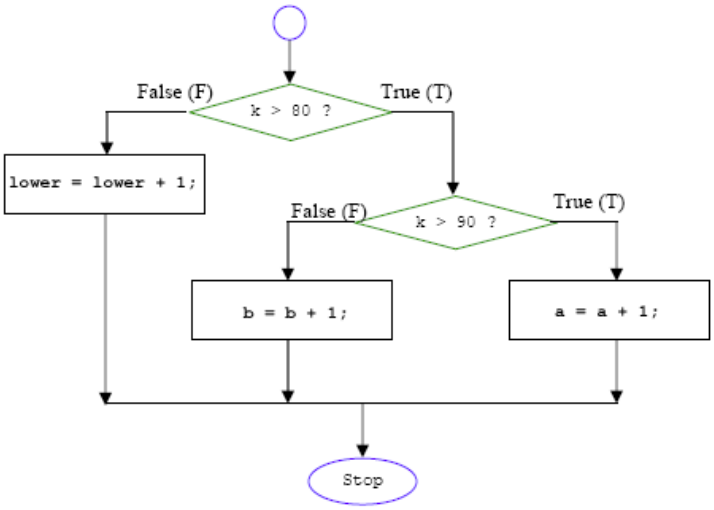
lower = lower + 1; a = a + 1; and b = b + 1;

```
#include <stdio.h>

int main(void)
{
    int i, k, a = 0, b = 0, lower = 0;
    printf("Enter the sample input line by line:\n");
    for(i = 1; i <= 7; i = i + 1)
    {
        scanf_s("%d", &k, 1);
        if(k >= 80)
            if(k >= 90)
                _____________________________
            else
                _____________________________
        else
            _____________________________
    }
    printf("A's = %d\tB's = %d\tLower = %d\n", a, b, lower);
    return 0;
}
```




```
if(k >= 80)
    if(k >= 90)
        a = a + 1;
    else
        b = b + 1;
else
  lower = lower + 1;
```

```
Enter the sample input line by line:
79
91
80
59
100
60
89
A's = 2 B's = 2 Lower = 3
Press any key to continue . . .
```



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