

PIC 10A 2B

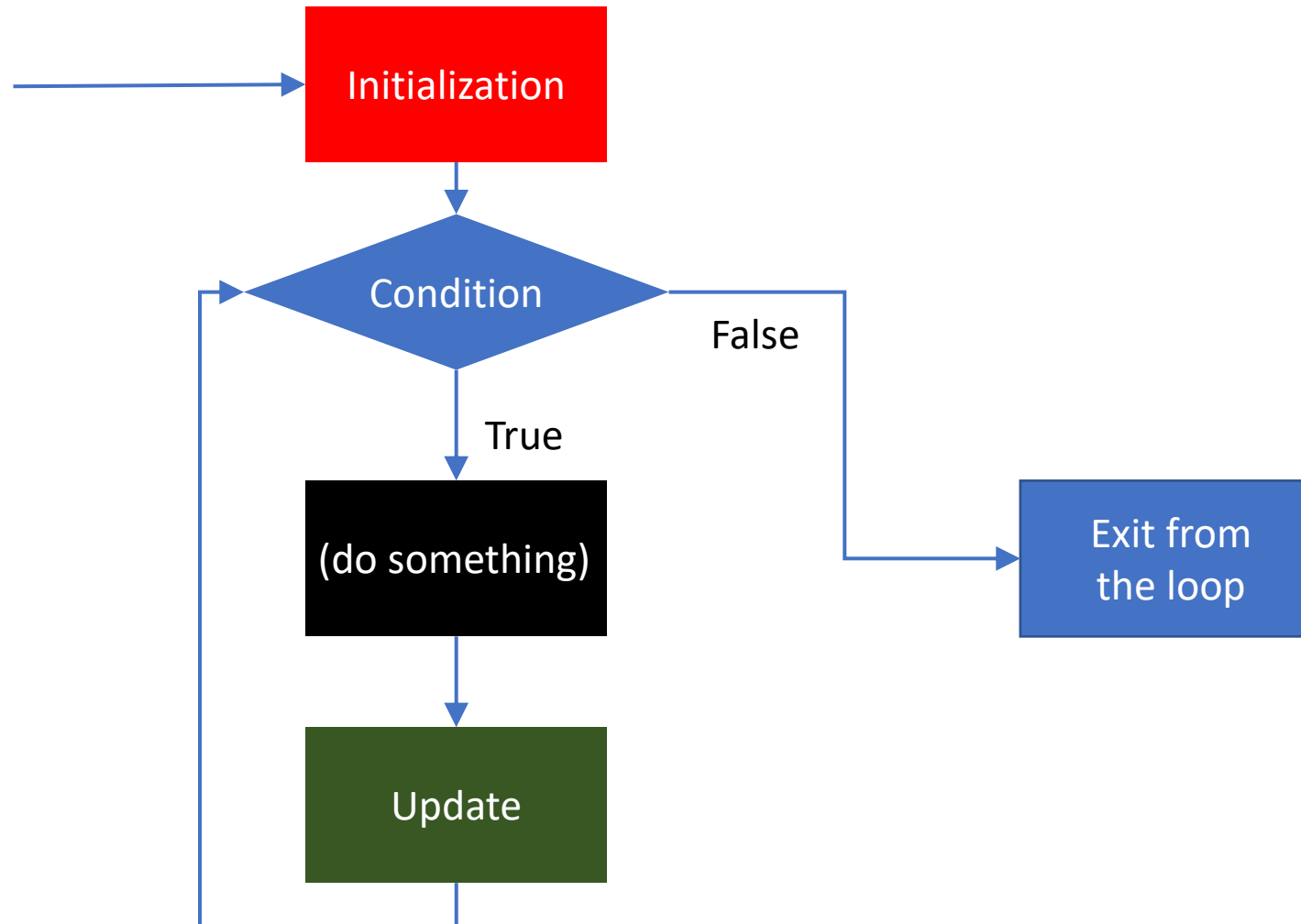
TA: Bumsu Kim

Today...

- Control Flows (Loops)
- Exercise Problems
 - Conceptual Questions
 - [Coding] Prime Factorization

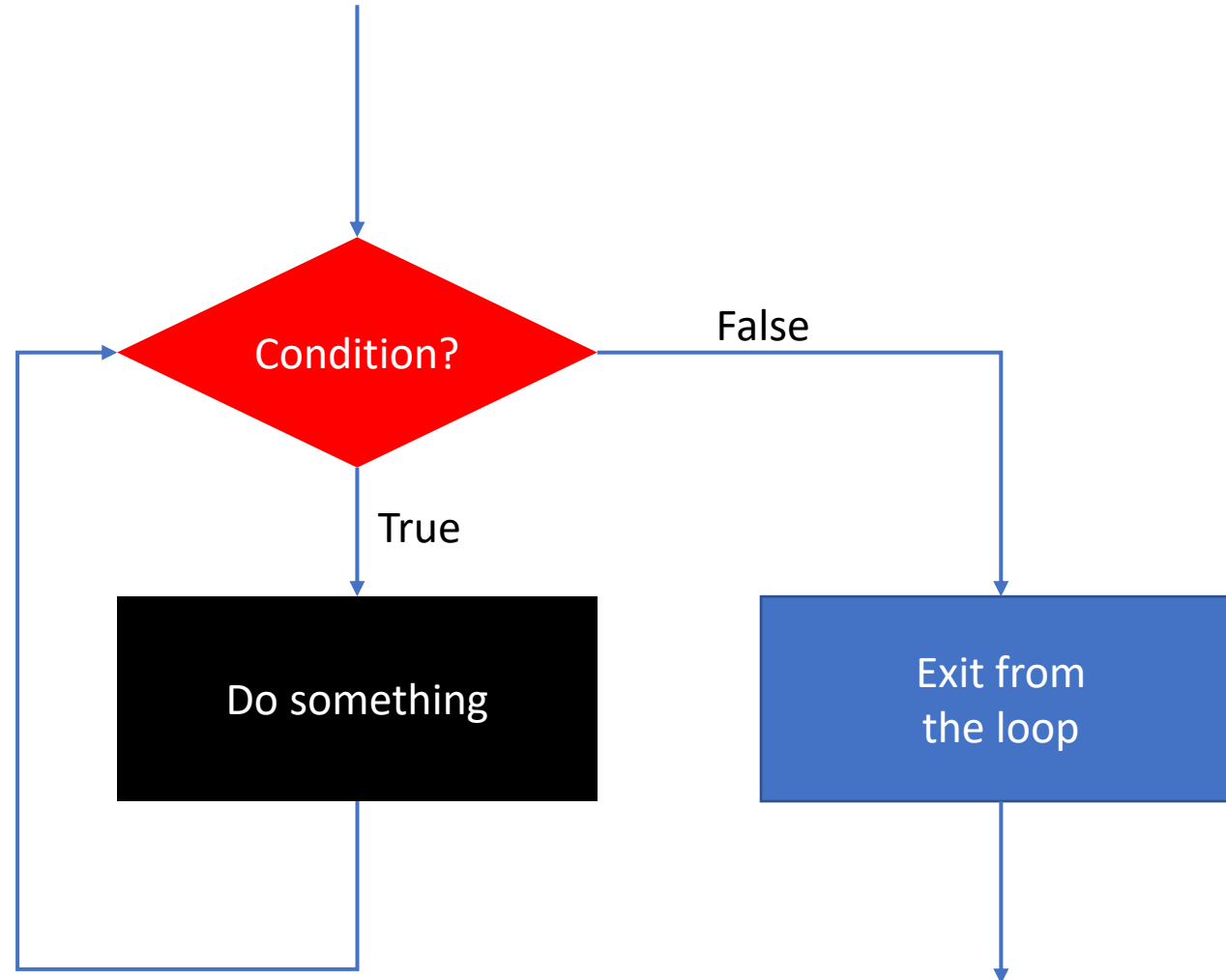
Review on **for**, **while**, and **do while**

- Flow chart



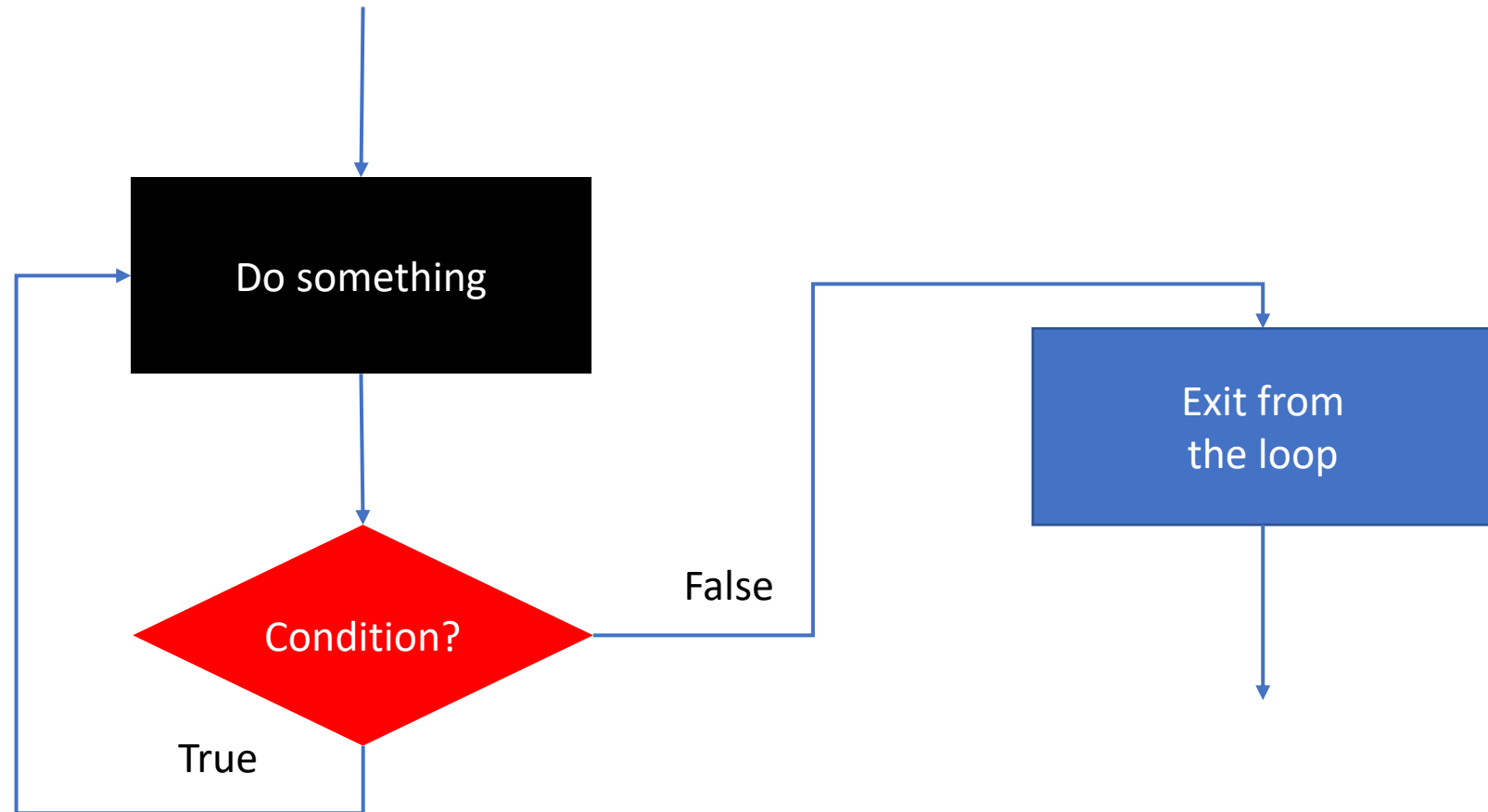
Review on **for**, **while**, and **do while**

- Flow chart



Review on **for**, **while**, and **do while**

- Flow chart



Exercise (Control Flow)

2. Consider the following program.

```
#include <iostream>
using namespace std;

int main() {
    int iter = 0;
    int n;
    cin >> n;
    while(iter < n) {
        iter += 2;
        cout << iter << endl;
    }
}
```

Which of the following choices most accurately describe the functionality?

- A. Print all positive even numbers less than the input.
- B. Print all positive even numbers less than or equal to the input.
- C. Print all positive even numbers less than or equal to the input + 1.
- D. Print all positive even numbers less than or equal to the input + 2.
- E. None of the above.

Exercise (Control Flow)

2. Consider the following program.

```
#include <iostream>
using namespace std;

int main() {
    int iter = 0;
    int n;
    cin >> n;
    while(iter < n) {
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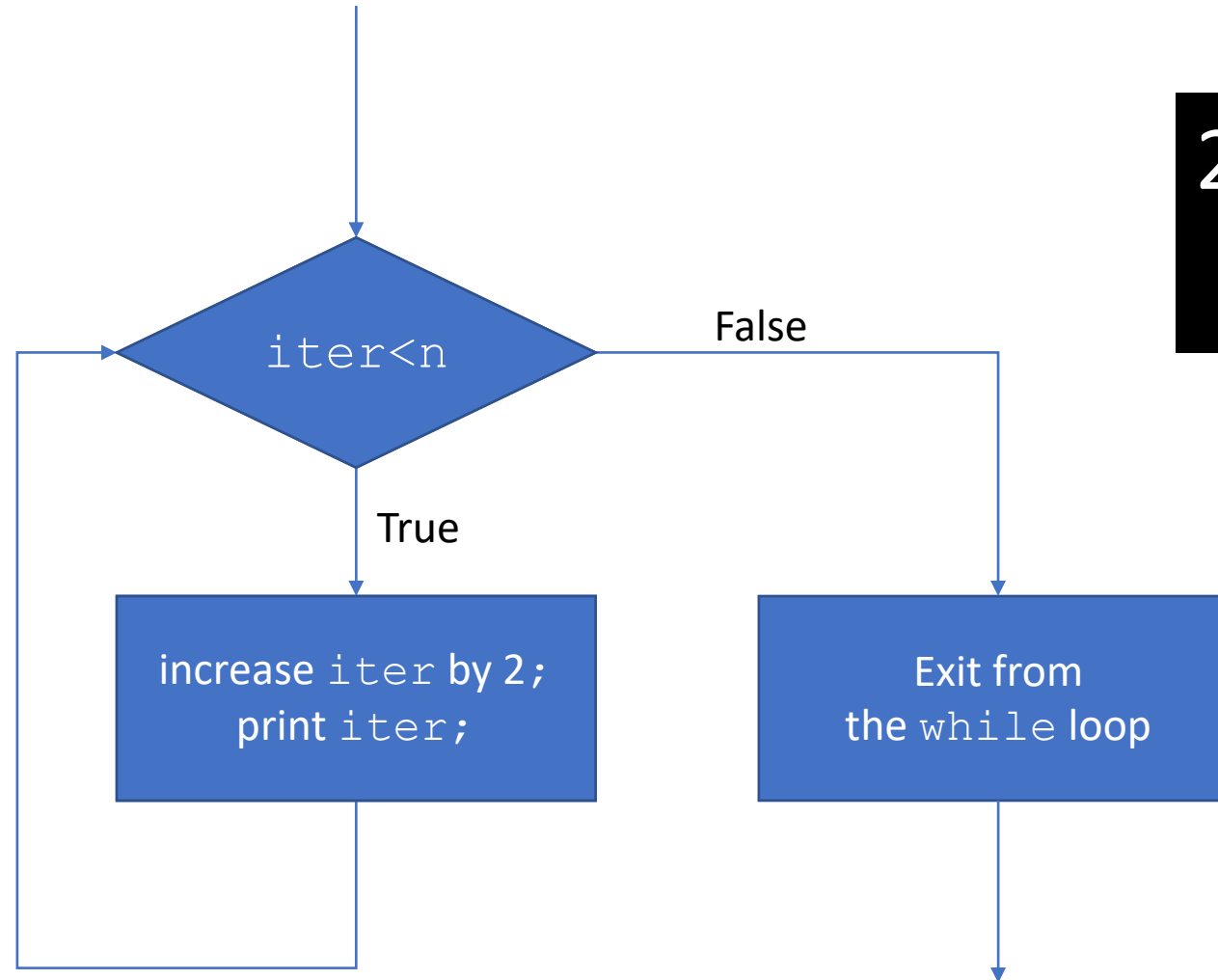
- A. Print all positive even numbers less than the input.
- B. Print all positive even numbers less than or equal to the input.
- C. Print all positive even numbers less than or equal to the input + 1.
- D. Print all positive even numbers less than or equal to the input + 2.
- E. None of the above.

- Answer: C
- Execute the statements in the loop only when $iter < n$, but $iter$ immediately becomes $iter+2$
- Consider the following examples →

Exercise (Control Flow)

- Ex1: $n=4$

```
1. iter=0
2. iter(0)<4?
3. iter←2
4. print 2
5. iter(2)<4?
6. iter←4
7. print 4
8. iter(4)<4?
9. exit
```

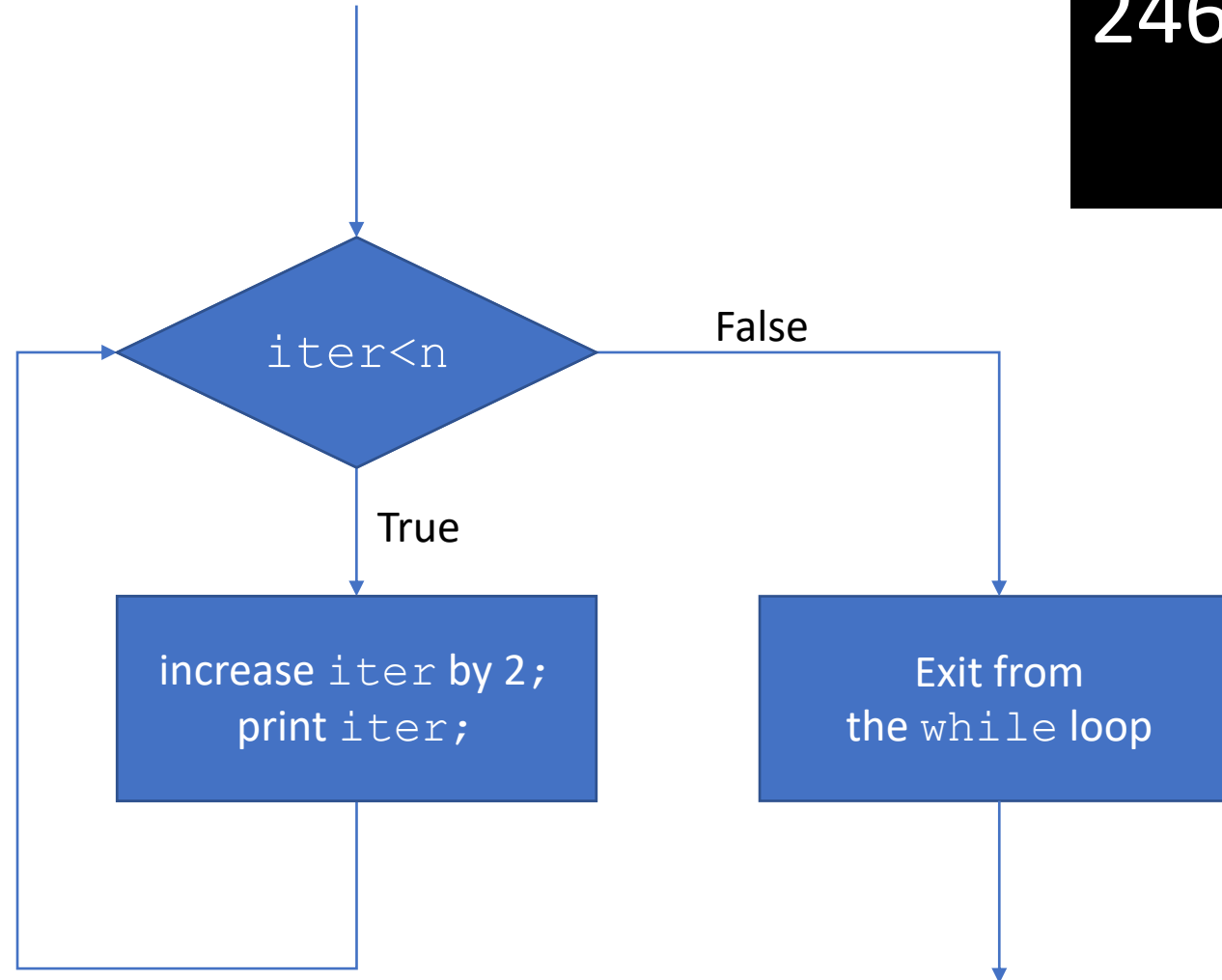


24

Exercise (Control Flow)

- Ex2: $n=5$

```
1. iter=0
2. iter(0)<5?
3. iter←2
4. print 2
5. iter(2)<5?
6. iter←4
7. print 4
8. iter(4)<5?
9. iter←6
10. print 6
11. exit
```



246

Exercise (Control Flow II)

- Predict the output of the code below:

```
cout << "start" << '\n';  
for (int i = 1; i < 4; ++i) {  
    for (int j = 1; j < i; ++j) {  
        cout << "*";  
    }  
    cout << '\n';  
}  
cout << "end";
```

Exercise (Control Flow II)

- Predict the output of the code below:

```
cout << "start" << '\n';  
for (int i = 1; i < 4; ++i) {  
    for (int j = 1; j < i; ++j) {  
        cout << "*";  
    }  
    cout << '\n';  
}  
cout << "end";
```

start

*

**

end

Exercise (Control Flow III)

- Describe the value of **j** in terms of **i** after the for loop:
- Hint) When **i** = 4567, what is **j**?

```
int i = (some positive integer);  
int j;  
for (j = i; (j / 10) > 0; j /= 10);
```

Exercise (Control Flow III)

- Describe the value of **j** in terms of **i** after the for loop:

- Hint) When **i** = 4567, what is **j**?

```
int i = (some positive integer);  
int j;  
for (j = i; (j / 10) > 0; j /= 10);
```

- Ans) **j** represents the first digit of **i**.
For instance, when **i** = 4567, **j** = 4.

Exercise: Prime Factorization

- Write a program that performs a prime factorization of a given integer.
- The output should exactly be:

```
Enter an integer to factorize: [User Input]  
The prime factorization of [User Input] is:  
[Factorization of the number]
```

- Some example runs of the program:

Hint:
Use a while loop

```
Microsoft Visual Studio Debug Console  
Enter an integer to factorize: 238  
The prime factorization of 238 is:  
2 x 7 x 17
```

```
Microsoft Visual Studio Debug Console  
Enter an integer to factorize: -720  
The prime factorization of -720 is:  
-2 x 2 x 2 x 2 x 3 x 3 x 5
```




```
Microsoft Visual Studio Debug Console  
Enter an integer to factorize: 2  
The prime factorization of 2 is:  
2
```

```
Microsoft Visual Studio Debug Console  
Enter an integer to factorize: 235486  
The prime factorization of 235486 is:  
2 x 19 x 6197
```

Your Feedback is welcome

- Don't hesitate to give a feedback on the discussion
- Use the link on my Github repo, or the link below:
 - <https://forms.gle/erZj1iSgHNrHQuXk6>

My Github repo on the web looks like:

 code	Week2 Tu
 LICENSE	Initial commit
 README.md	Update README.md

README.md

PIC10A

PIC10A discussion 2B, UCLA for Fall 2022

Google form link for feedbacks: <https://forms.gle/erZj1iSgHNrHQuXk6>

 Click this link