



Computer Programming in Python

Chapter 3A
Complete Example

Chapter 3A Complete Example in Python

- Chapter 3 Complete Example
 - Theater Program
 - Requirements
 - Design
 - Development
 - Test

Chapter 3A Complete Example in Python

- Requirements:
 - Write a program for a Theater Manager that computes the total sales receipts and profit for an event based on the number of tickets sold at \$29.50 each, and the cost to hold an event which is \$1,475.00.

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- How to begin
 - Determine what the program does
 - What it needs to complete the task (input)
 - The operations it will perform (process)
 - What it will produce (output)

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Program Requirements Decomposition:

1. The program computes total sales and profit for a Theater Manager
2. The program **input** is the number of tickets sold
3. The program **computes** total sales based on the number of tickets sold and the price for each ticket
4. The program **computes** the profit for the event based on the total sales from tickets and the cost to hold the event
5. The program will **output** the total sales amount and the profit

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- Pseudocode or a flowchart can help to determine the correct order of operations

Step 1 Start and announce the program

Step 2 Prompt for tickets sold and store the value

Step 3 Compute total sales - Tickets sold * \$29.50

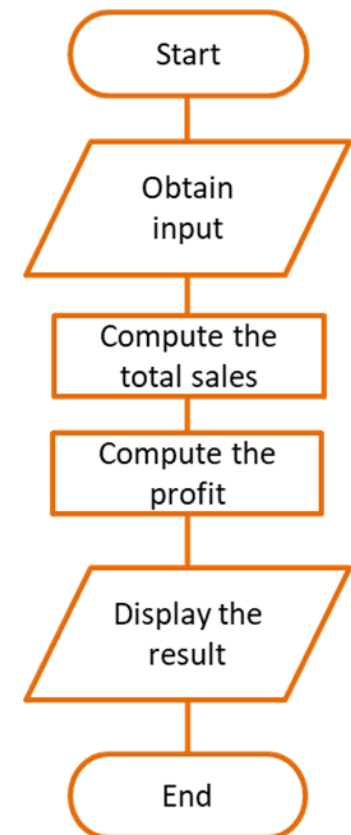
Step 4 Store the total sales in a variable

Step 6 Compute profit – total sales - \$1,475.00

Step 7 Store the profit in a variable

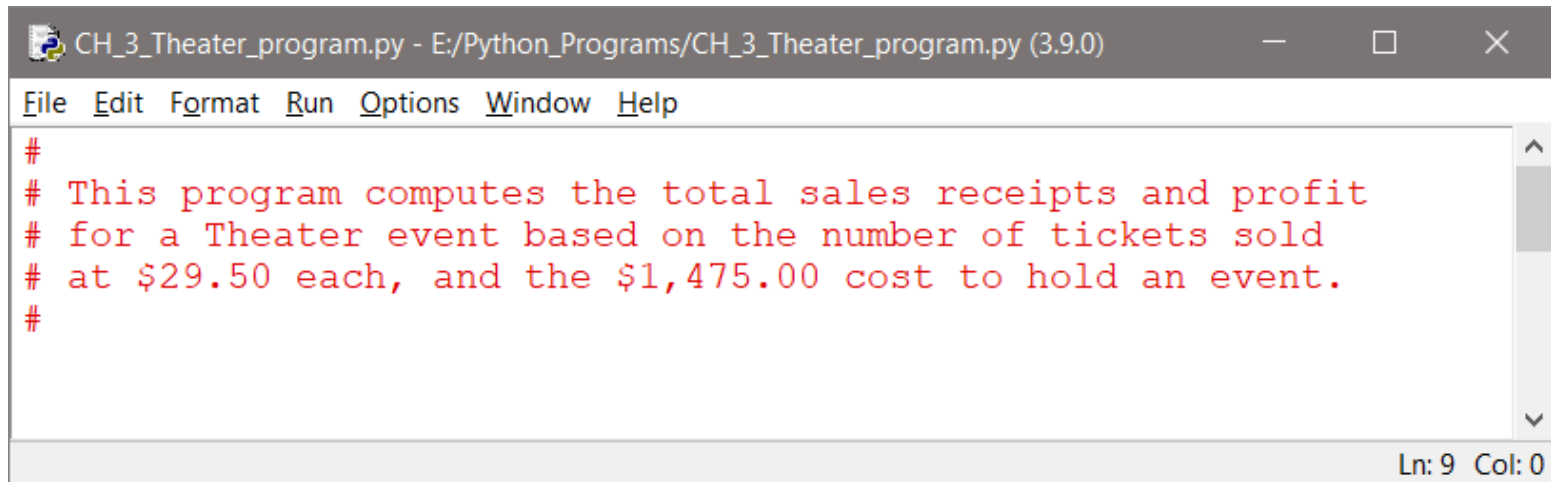
Step 7 Display the total sales and profit

Step 8 End the program



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- Development
 - Begins by creating a file, naming it, and adding a description of the program



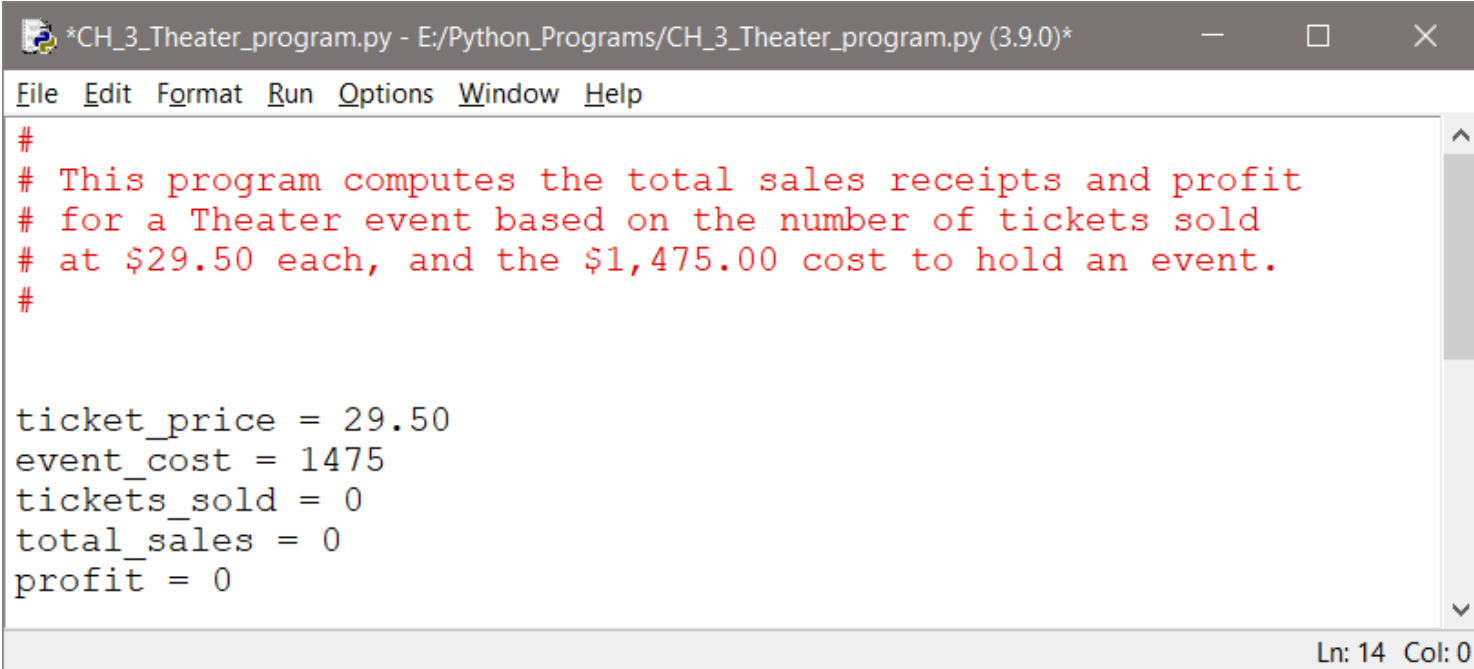
```
CH_3_Theater_program.py - E:/Python_Programs/CH_3_Theater_program.py (3.9.0)
File Edit Format Run Options Window Help
#
# This program computes the total sales receipts and profit
# for a Theater event based on the number of tickets sold
# at $29.50 each, and the $1,475.00 cost to hold an event.
#
Ln: 9 Col: 0
```

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- Development
 - The variables needed by the program are defined next
 - Can be determined by the program input, output, and the processing that will be performed
 - The ticket price and event cost are provided
 - The number of tickets sold will be input
 - The total sales and profit will be computed

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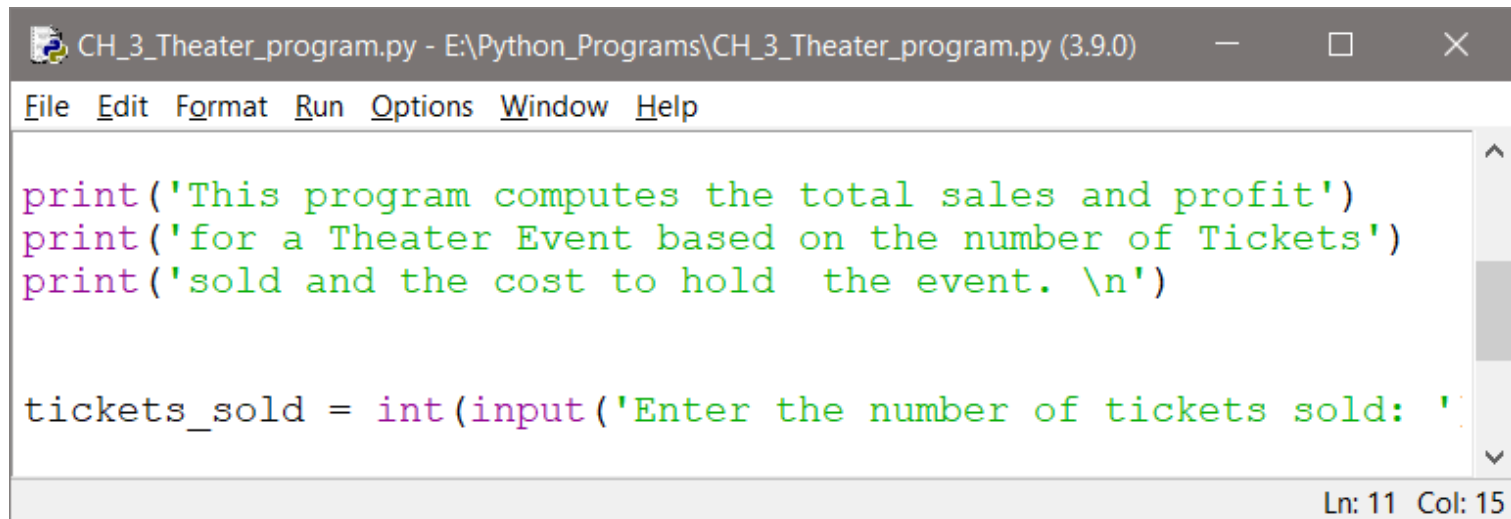
- Development
 - The variables needed by the program



```
*CH_3_Theater_program.py - E:/Python_Programs/CH_3_Theater_program.py (3.9.0)*
File Edit Format Run Options Window Help
#
# This program computes the total sales receipts and profit
# for a Theater event based on the number of tickets sold
# at $29.50 each, and the $1,475.00 cost to hold an event.
#
ticket_price = 29.50
event_cost = 1475
tickets_sold = 0
total_sales = 0
profit = 0
Ln: 14 Col: 0
```

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- Development
 - Next, an announcement to the user of what the program does, and the input section to obtain the number of tickets sold

A screenshot of a Python IDE window titled "CH_3_Theater_program.py - E:\Python_Programs\CH_3_Theater_program.py (3.9.0)". The window has a menu bar with "File", "Edit", "Format", "Run", "Options", "Window", and "Help". The main text area contains the following Python code:

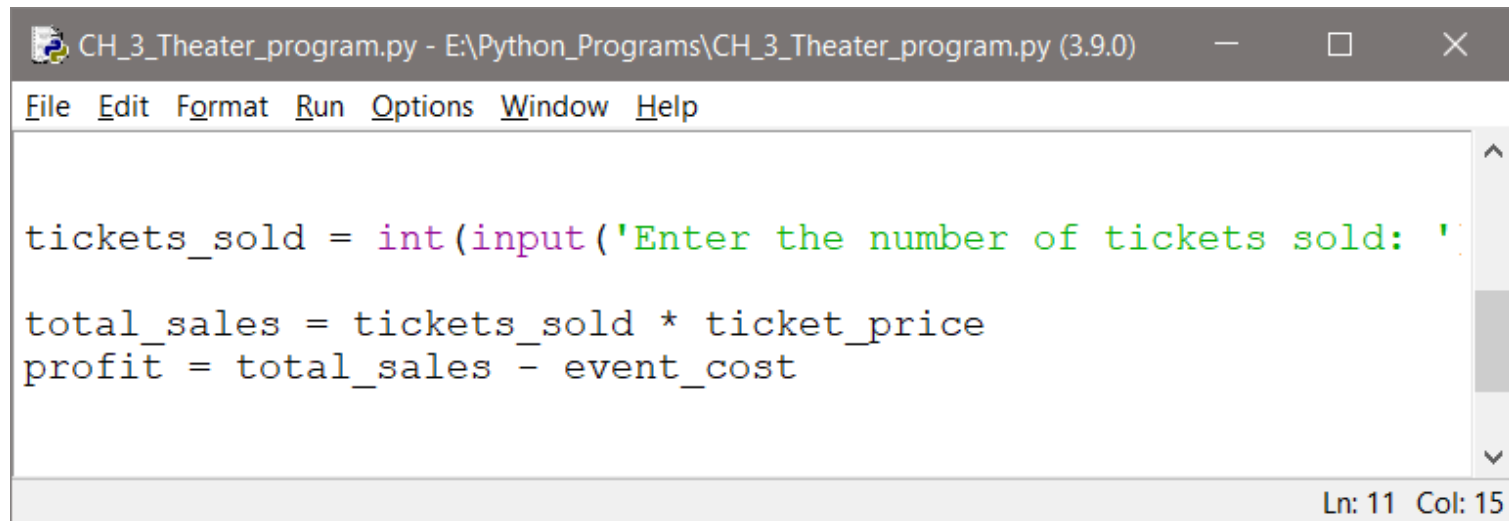
```
print('This program computes the total sales and profit')
print('for a Theater Event based on the number of Tickets')
print('sold and the cost to hold the event. \n')

tickets_sold = int(input('Enter the number of tickets sold: '))
```

The status bar at the bottom right shows "Ln: 11 Col: 15".

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- Development
 - The processing section computes the total sales from the tickets sold, and then the profit once the total sales amount is computed



```
CH_3_Theater_program.py - E:\Python_Programs\CH_3_Theater_program.py (3.9.0)
File Edit Format Run Options Window Help

tickets_sold = int(input('Enter the number of tickets sold: '))

total_sales = tickets_sold * ticket_price
profit = total_sales - event_cost

Ln: 11 Col: 15
```

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- Development
 - Finally, the output section is completed with format specifiers for the dollar amounts

```
print('\n\nThe Total Sales are: $', format(total_sales, '.2f'))  
print('The profit for the event is: $', format(profit, '.2f'))
```

The complete code is on the next slide.

Note the blank lines between sections to enhance readability



```
CH_3_Theater_program.py - E:\Python_Book_Programs\CH_3\CH_3_Theater_program.py...
File Edit Format Run Options Window Help
#
# This program computes the total sales receipts and profit
# for a Theater event based on the number of tickets sold
# at $29.50 each, and the $1,475.00 cost to hold an event.
#

ticket_price = 29.50
event_cost = 1475
tickets_sold = 0
total_sales = 0
profit = 0

print('This program computes the total sales and profit')
print('for a Theater Event based on the number of Tickets')
print('sold and the cost to hold the event. \n')

tickets_sold = int(input('Enter the number of tickets sold: '))

total_sales = tickets_sold * ticket_price
profit = total_sales - event_cost

print('\nThe Total Sales are: $', format(total_sales, '.2f'))
print('The profit for the event is: $', format(profit, '.2f'))
```

Ln: 30 Col: 0

```
CH_3_Theater_program.py - E:\Python_Book_Programs\CH_3\CH_3_Theater_program.py...
File Edit Format Run Options Window Help
#
# This program computes the total sales receipts and profit
# for a Theater event based on the number of tickets sold
# at $29.50 each, and the $1,475.00 cost to hold an event.
#

ticket_price = 29.50
event_cost = 1475
tickets_sold = 0
total_sales = 0
profit = 0

print('This program computes the total sales and profit')
print('for a Theater Event based on the number of Tickets')
print('sold and the cost to hold the event. \n')

tickets_sold = int(input('Enter the number of tickets sold: '))

total_sales = tickets_sold * ticket_price
profit = total_sales - event_cost

print('\nThe Total Sales are: $', format(total_sales, '.2f'))
print('The profit for the event is: $', format(profit, '.2f'))
```

variable declarations

input

processing

output

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- Testing the program includes initially using input data that is easy to verify
- Since $100 * \$29.50$, and $\$2950 - \1475 are easily checked, testing begins with 100 tickets

```
This program computes the total sales and profit  
for a Theater Event based on the number of Tickets  
sold and the cost to hold the event.
```

```
Enter the number of tickets sold: 100
```

```
The Total Sales are: 2950.00  
The profit for the event is: 1475.00  
>>>
```

Chapter 3A Complete Example in Python

- **Project Summary:**

- A step-by-step approach forms good program design and development habits that are critical in developing complex programs
- As complexity increases, so does the chance that errors will be introduced
- The goal is to minimize errors and debugging time, and deliver a computer-based solution that meets the requirements

Chapter 3A Complete Example in Python

- **Project Summary:**

- A step-by-step approach

- Step 1 Review the program requirements

- Ensure an accurate understanding of the task

- Step 2 Requirements Decomposition

- Break down the task in sub-tasks

- Use pseudocode and a flowchart to determine the solution

- Step 3 Development – programming the solution

- Step 4 Testing and debugging

Chapter 3A Complete Example

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