Repetition Structure

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Chapter 4
Gaddis, T. (2019). Starting out with Python. New York, NY: Pearson
Algorithm Workbench

1 Bug Collector

```
In [1]: total = 0;
        for days in range(5):
            week = ["Monday","Tuesday","Wednesday","Thursday","Friday"]
            bugs = int(input("How many bugs were colleceted day {}: ".format(week[days]))) # o
            total = total + bugs
        print("{} bugs were collected".format(total))
```

```
How many bugs were colleceted day Monday: 1
How many bugs were colleceted day Tuesday: 1
How many bugs were colleceted day Wednesday: 1
How many bugs were colleceted day Thursday: 1
How many bugs were colleceted day Friday: 1
5 bugs were collected
```

2 Calories Burned

```
In [2]: caloriesPerMin = 4.2
        for minutes in range(10,30,5):
            calories = caloriesPerMin*minutes
            print("In {} you burned {} calories".format(minutes,calories))
```

```
In 10 you burned 42.0 calories
In 15 you burned 63.0 calories
In 20 you burned 84.0 calories
In 25 you burned 105.0 calories
```

3 Budget Analysis

```
In [3]: budget = int(input("Enter budget amount for a month: "))
        total = 0
        yesno = "y"
        while yesno == "y":
            expense = int(input("Enter expense: "))
            total = total + expense;
            yesno = input("More expenses? Enter y or n:")
        print(" ${} is the total amount spent. ".format(total))
        if(total < budget):
            underAmount = budget - total;
            print("Underbudget by {}".format(underAmount))
```

```
Enter budget amount for a month: 1
Enter expense: 1
More expenses? Enter y or n:1
 $1 is the total amount spent.
```

4 Distance Traveled

```
In [4]: mph = int(input("Enter the miles per hour travelled: "))
        hours = int(input("Enter number of hours travelled: "))
        for travel in range(1,hours):
            distance = mph*travel;
            print("In the {} hour the vehicle travelled {} miles".format(hours, distance))
```

```
Enter the miles per hour travelled: 1
Enter number of hours travelled: 1
```

5 Average Rainfall

```
In [5]: yearsNum = int(input("Enter the number of years: "))
        monthsInYear = 12
        totalRainfall = 0
        averageRainfalPerMonth = 0
        for years in range(yearsNum):
            print("For year {}".format(years + 1))
            for month in range(monthsInYear):
                rainfallMonth = int(input("Enter amount of rainfall month number {} :".format(m
                totalRainfall = totalRainfall + rainfallMonth;
        yearsToMonth = yearsNum*monthsInYear
        averageRainfall = totalRainfall/yearsToMonth
        print("There are {} months in {} years".format(yearsToMonth,yearsNum))
```

```
        print("Total rainfal was {} inches".format(totalRainfall))
        print("Average rainfall per month is {}".format(averageRainfall))
```

```
Enter the number of years: 1
For year 1
Enter amount of rainfall month number 1 :1
Enter amount of rainfall month number 2 :1
Enter amount of rainfall month number 3 :1
Enter amount of rainfall month number 4 :1
Enter amount of rainfall month number 5 :1
Enter amount of rainfall month number 6 :1
Enter amount of rainfall month number 7 :1
Enter amount of rainfall month number 8 :1
Enter amount of rainfall month number 9 :1
Enter amount of rainfall month number 10 :1
Enter amount of rainfall month number 11 :1
Enter amount of rainfall month number 12 :1
There are 12 months in 1 years
Total rainfal was 12 inches
Average rainfall per month is 1.0
```

6 Celsius to Fahrenheit Table

```
In [6]: print("Celsius \t Fahrenheit")
        for celsius in range(0,20,1):
            fahrenheit = (9/5.0)*celsius + 32;
            print("{} \t\t  {} ".format(celsius,fahrenheit))
```

```
Celsius          Fahrenheit
0                   32.0
1                   33.8
2                   35.6
3                   37.4
4                   39.2
5                   41.0
6                   42.8
7                   44.6
8                   46.4
9                   48.2
10                   50.0
11                   51.8
12                   53.6
13                   55.400000000000006
14                   57.2
15                   59.0
16                   60.8
17                   62.6
```

```
18                  64.4
19                  66.2
```

7 Pennies for Pay

```
In [17]: numberOfDays = int(input("Enter number of days worked: "))
         salary = 0.0
         pennies = 1;
         totalSalary = 0;
         for day in range(numberOfDays):
             salary = pennies
             pennies *= 2
             totalSalary = totalSalary + salary
             salaryDollars = salary/100
             print("On day {} salary is {} dollars".format(day + 1, salaryDollars))
         totalSalaryDollars = totalSalary/100
         print("Total pay was {} dollars".format(totalSalaryDollars))
```

```
Enter number of days worked: 10
On day 1 salary is 0.01 dollars
On day 2 salary is 0.02 dollars
On day 3 salary is 0.04 dollars
On day 4 salary is 0.08 dollars
On day 5 salary is 0.16 dollars
On day 6 salary is 0.32 dollars
On day 7 salary is 0.64 dollars
On day 8 salary is 1.28 dollars
On day 9 salary is 2.56 dollars
On day 10 salary is 5.12 dollars
Total pay was 10.23 dollars
```

8 Sum of Numbers

```
In [11]: sum = 0;
         userNumber = float(input("Enter a positive number or negative number to end : "))
         while(userNumber >= 0):
             sum = sum + userNumber
             userNumber = float(input("Enter a positive number or negative number to end : "))
         print("The total sum is {}".format(sum))
```

```
Enter a positive number or negative number to end : .5
Enter a positive number or negative number to end : .5
Enter a positive number or negative number to end : -1
The total sum is 1.0
```

9 Ocean Levels

```
In [24]: oceanRise = 1.6 #millimeters per year
         yearAmount = 25 #years
         for year in range(yearAmount):
             oceanRisen = oceanRise*(year+1)
             print("In year {} ocean will have risen {} millimeters".format(year + 1,oceanRise
```

```
In year 1 ocean will have risen 1.6 millimeters
In year 2 ocean will have risen 3.2 millimeters
In year 3 ocean will have risen 4.800000000000001 millimeters
In year 4 ocean will have risen 6.4 millimeters
In year 5 ocean will have risen 8.0 millimeters
In year 6 ocean will have risen 9.600000000000001 millimeters
In year 7 ocean will have risen 11.200000000000001 millimeters
In year 8 ocean will have risen 12.8 millimeters
In year 9 ocean will have risen 14.4 millimeters
In year 10 ocean will have risen 16.0 millimeters
In year 11 ocean will have risen 17.6 millimeters
In year 12 ocean will have risen 19.200000000000003 millimeters
In year 13 ocean will have risen 20.8 millimeters
In year 14 ocean will have risen 22.400000000000002 millimeters
In year 15 ocean will have risen 24.0 millimeters
In year 16 ocean will have risen 25.6 millimeters
In year 17 ocean will have risen 27.200000000000003 millimeters
In year 18 ocean will have risen 28.8 millimeters
In year 19 ocean will have risen 30.400000000000002 millimeters
In year 20 ocean will have risen 32.0 millimeters
In year 21 ocean will have risen 33.6 millimeters
In year 22 ocean will have risen 35.2 millimeters
In year 23 ocean will have risen 36.800000000000004 millimeters
In year 24 ocean will have risen 38.400000000000006 millimeters
In year 25 ocean will have risen 40.0 millimeters
```

10 Tuition Increase

```
In [28]: percentIncrease = 3 # percent
         yearAmount = 5 # years
         tuition = 8000 # Per semester
         tuitionYear = tuition*2 # Per year
         projectedTution = 0
         for year in range(yearAmount):
             tuitionRate = (tuitionYear)*.03
             projectedTution = projectedTution + (tuitionRate + tuitionYear)
             print("In year {} projected tuition will be {}".format(year + 1, projectedTution)
```

```
In year 1 projected tuition will be 16480.0
In year 2 projected tuition will be 32960.0
In year 3 projected tuition will be 49440.0
In year 4 projected tuition will be 65920.0
In year 5 projected tuition will be 82400.0
```

11 Calculating the Factorial of a Number

```
In [35]: number = int(input("Enter nonnegative integer n: "))
         factorial = 1
         for num in range(number):
             factorial = (num+1)*factorial
         print("{}! is {}".format(number,factorial))
```

```
Enter nonnegative integer n: 3
3! is 6
```

12 Population

```
In [5]: organismCount = int(input("Enter number of starting number of organisms: "))
        averageIncrease = float(input("Enter the average daily population increase in percentag
        dayNumMult = int(input("Enter number of days the organism will be left to multiply: "))
        print("Day Approximate \t Population")
        increasePopulation = 0
        for days in range(dayNumMult):
            organismCount = organismCount + increasePopulation
            increasePopulation = organismCount*(averageIncrease/100)
            print("{}\t\t{}".format(days + 1, organismCount))
```

```
Enter number of starting number of organisms: 2
Enter the average daily population increase in percentage: 30
Enter number of days the organism will be left to multiply: 10
Day Approximate          Population
1                2
2                2.6
3                3.38
4                4.394
5                5.7122
6                7.42586
7                9.653618
8                12.5497034
9                16.31461442
10                21.208998746000002
```

13 Write a program that uses nested loops to draw this pattern:

```
In [16]: num_row = 7
         num_col = 7
         for r in range(num_row):
             for c in range(r):
                 print('',end='')
             print("*"*num_col)
             num_col = num_col - 1
```

```
*******
******
*****
****
***
**
*
```

14 Write a program that uses nested loops to draw this pattern:

```
In [25]: num_row = 6
         num_col = 0
         for r in range(num_row):
             for c in range(r):
                 print('',end='')
             print("#{}#".format(" "*num_col))
             num_col +=1
```

```
##
# #
#  #
#   #
#    #
#     #
```