# CS 602 Data Driven Programming with Python, Summer 2021

## Programming Assignment 1. Bitcoin Pizza Day

On May 22, 2010, [Laszlo Hanyecz](https://en.bitcoin.it/wiki/Laszlo_Hanyecz) purchased two Papa John's pizzas for the price of 10,000 bitcoin (BTC). At that time, no retailers were accepting bitcoin for the purchase of goods or services, so this purchase was an historical milestone in the evolution of bitcoin as a mainstream cryptocurrency. In honor of the 11th anniversary of "Bitcoin Pizza Day", your first assignment will perform basic calculations related to past and current values of bitcoin.

## Starting Facts

* In 2010, 1 bitcoin was valued at $0.0041 cents.
* In 2021, 1 bitcoin is valued at $57484.40 USD and 47800.54 euros.
* The price of gold in the United States is $1772.15 per ounce.
* The price of silver in the United States is $26.17 per ounce.
* 1 gram = 0.035274 ounces.
* Laszlo Hanyecz ordered a 16" pizza.
* One bite of pizza is approximately one square inch. You can calculate the cost of a bite of pizza as the cost of the entire pizza divided by the cost of the area of the pizza. .[[1]](#footnote-1) Recall from math class that the area of a pizza is pi \* radius \* radius.

## Calculations

Write a program to calculate:

* The cost of Laszlo's pizza in 2010, in USD
* The cost per bite of his pizza in 2010.
* The value of his purchase today in USD, had he invested the BTC instead.
* The area of the pizza, rounded to three decimal places
* The cost per bite in 2010 and 2021.
* The percentage increase of bitcoin from 2010 to 2021.

Ask the user to enter the amount in USD to invest in bitcoin. Calculate:

* The value, in BTC, that the user's amount would have purchased in 2010
* The value, in BTC, that the user's amount would purchase today
* The value, in EURO, of the user's BTC purchase today.

## Sample Output

This section shows what the output of your program might look like. Green italics represents values entered by the user.

This program calculates:

- cost of the first pizza purchased with bitcoin, then and now

- cost of one bite of pizza, then and now, and its area

- percentage increase in bitcoin from 2010 to 2021.

- values of bitcoin purchases then and now

What is your name? *Mark*

Happy Bitcoin Pizza Day, MARK!

Laszlo's pizza cost 10000 BTC, or $41.00 in 2010.

Today 10000 BTC is worth $571,249,000.00.

The area of the pizza is 201.062 square inches.

The cost of one bite of pizza in 2010 was $0.20

That would be $2,841,159.44 in 2021.

Bitcoin has increased in value by 13,932,901.44% from 2010 to 2021.

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Mark, how many dollars would you like to invest in bitcoin? *20*

$20.00 would have purchased 4878.048780 BTC in 2010.

$20.00 will purchase 0.000350 BTC today.

Today 0.000350 BTC is worth 16.74 EURO.

## Requirements

1. Import the math library to get the value of math.pi, or set a named (symbolic) constant to a value of pi.
2. Use the multiplication operator for characters to print 50 equal signs as a separator in the output.
3. Display all currency values (EURO and USD) to two decimal places and all BTC values to six decimal places. Show dollar amounts and percentages greater than 1000 with commas and decimal points. Although the book uses the format function (section 3.6) to format strings, I encourage you to use f-strings, which are a newer feature of Python and more concise. The format string code {amount:0,.2f} will display the value of the variable amount using commas and two decimal places. Watch for additional examples in class.
4. Use named (symbolic) constants, by convention written in all uppercase letters, to represent all of the fixed values in this problem. Use these constants in your calculations. Do not hard-code any values in your code that performs the calculations, as it would be difficult to modify your code when these values change. Run the program once with the values given in the **Starting Facts** section above. After the program runs correctly, *comment out* the line of code assigning the current value of a bitcoin by placing a # in front of it, and add a line of code directly below that assigns value to 57124.90. Run your program again.
5. Try to make your output match the sample output as closely as possible. Include a multi-line string, new line and tab characters at least once.

## Grading

Your program should compile without syntax errors to receive any credit. If a part of your program is working, you will receive partial credit, but only if the program compiles without syntax errors. This assignment is worth 20 points and contributes toward 5% of your course grade.

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| --- | --- |
| Ask for the user's name and investment amount | 2 |
| Display the user's name in upper case in the Welcome prompt | 1 |
| Compute the calculations from input values as described in the Calculations section | 10 |
| Formatting output with correct number of decimals, and commas as described in requirement 1 | 2 |
| Comments and good programming style | 1 |
| Use of symbolic constants and commented out code as described in requirement 2 | 1 |
| Output formatting matches sample output (multiline string, tabs, new lines, separator line of equal signs) | 3 |
| Total | 20 |

## Reminders

1. You may use the integrated development environment of your choice (PyCharm, Eclipse, Spider, VSCode, etc.) to complete this and any projects during the course, unless specifically instructed otherwise.
2. This project requires knowledge of only very basic mathematical operations on numeric values. When working on a project always make sure you understand the program requirements first, and then think about the algorithm that you will use and write out the steps. Only after you have thought through the details of the algorithm and verified it on a few test cases, should start working on its implementation in Python. Be sure to test your program using multiple different test cases. When working on the program it is important to learn to develop it gradually by implementing onelogical step of the algorithm at a time and testing the program after implementing each step.
3. You don't need to write code that uses any loops, if statements, lists or other structures that we did not include in the first class. Don't make this problem harder than it is!
4. You can collaborate on practice problems, but the only help you can get on a programming project is from the instructor or one of the tutors in the CIS Sandbox. You can make appointment with a tutor by clicking on the link on our course Blackboard site, or drop in to meet with a tutor during their online hours in the CIS Sandbox (<http://cissandbox.com>). Or you can visit the tutor assigned to our class during their weekly available office hours for review.
5. Verify that your program works and meets the requirements. Submit your completed .py file on Blackboard before the due date.

1. https://www.wikihow.com/Figure-Cost-Per-Square-Inch-of-Pizza [↑](#footnote-ref-1)