

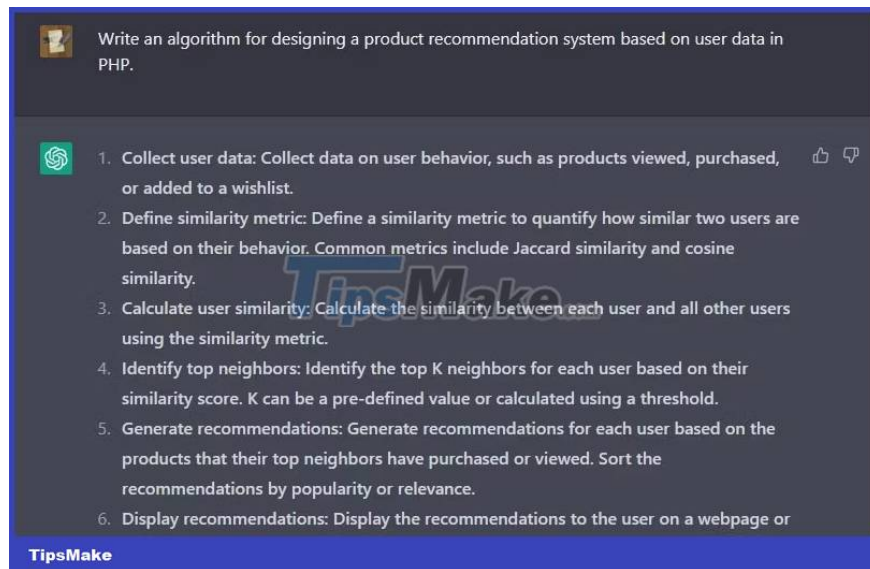
9 practical applications of ChatGPT in programming

Since OpenAI launched ChatGPT, this extraordinary AI chatbot has found its place in many fields, including complex programming.

But as a programmer, what exactly can you do with ChatGPT? In what practical ways can you use this AI chatbot in your daily workflow as a programmer? TipsMake.com.com has compiled 9 practical ways to integrate ChatGPT into your workflow as a programmer.

1. Create Efficient Algorithms

While some developers are quickly entrusting the entire software development process to ChatGPT, this can lead to disaster. ChatGPT can generate some impressive code. But it's best to use it as a companion tool and human programmers still have to control most of the development.



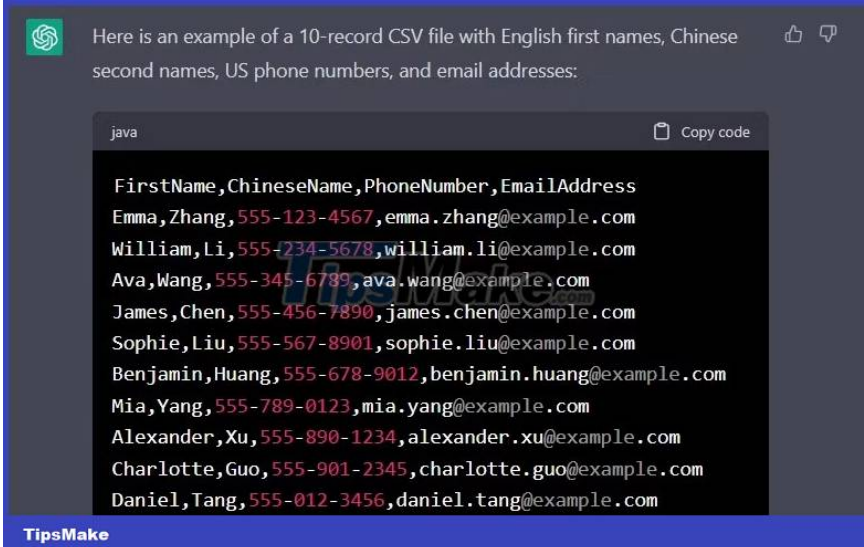
A good way to do this is to have the chatbot help you map out an efficient algorithm while doing the rest in creating a robust program. You can ask ChatGPT to generate the algorithm in plain text, using ASCII Art, in tree format, using boxes, or any other creative visualization technique you can think of.

2. Create a placeholder or to be filled in

As a programmer, you may need placeholder data from time to time to work. Whether it's database data to test APIs or long-form text to fill out web pages, ChatGPT can create different types of placeholder data to suit your needs.

ChatGPT can generate content in SQL, JSON, CSV and dozens of other formats. It can even create native data structures like arrays and lists, in any popular programming language of choice.

While you can find plenty of placeholder data generators online, few options offer the same level of data customization you can get from ChatGPT. For example, you could ask ChatGPT to create a 2,000-record CSV file containing the first name in English, the second name in Chinese in uppercase, and a US phone number:



Here is an example of a 10-record CSV file with English first names, Chinese second names, US phone numbers, and email addresses:

```
java Copy code
FirstName,ChineseName,PhoneNumber,EmailAddress
Emma,Zhang,555-123-4567,emma.zhang@example.com
William,Li,555-234-5678,william.li@example.com
Ava,Wang,555-345-6789,ava.wang@example.com
James,Chen,555-456-7890,james.chen@example.com
Sophie,Liu,555-567-8901,sophie.liu@example.com
Benjamin,Huang,555-678-9012,benjamin.huang@example.com
Mia,Yang,555-789-0123,mia.yang@example.com
Alexander,Xu,555-890-1234,alexander.xu@example.com
Charlotte,Guo,555-901-2345,charlotte.guo@example.com
Daniel,Tang,555-012-3456,daniel.tang@example.com
```

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You can get as specific as possible with the type of placeholder data you want. This is something you may not be able to achieve easily with the free placeholder data generator tools you can find online.

3. Data Format

Sometimes you will have a lot of plain text that needs formatting to a compatible data type. Maybe you need some plain text formatted to CSV or JavaScript object as an array. Or maybe you need to convert or format a data structure in one language to a similar data structure in another.

You can spend the time and effort writing regex functions to handle it, or you can provide instructions in English and let ChatGPT do the heavy lifting.

The screenshot below shows a messy and unlabeled piece of data fed to ChatGPT.

Sarah Nguyen with ID 345 can be reached at snguyen@gmail.com or (555) 999-0000. David Kim has ID 234 and can be contacted at dkim@gmail.com or (555) 777-8888. Samantha Lee's email is samlee@email.com and her phone number is (555) 111-2222. Lauren Brown's phone number is (555) 666-7777, and her email address is lbrown@email.com. Michael Kim, with ID 876, can be reached at mkim@hotmail.com or (555) 888-9999. Emily Chen's email address is emilychen@yahoo.com, and her phone number is (555) 444-5555. Alex Wong has ID 789 and can be contacted at awong@hotmail.com or (555) 222-3333. Lastly, Jason Park's email address is jpark@example.com, and his phone number is (555) 333-4444.

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When asked to parse this data and present it in a table, ChatGPT replied as follows:



Sure! Here is the same data presented in a table format:

ID	Name	Email	Phone
345	Sarah Nguyen	snguyen@gmail.com	(555) 999-0000
234	David Kim	dkim@gmail.com	(555) 777-8888
987	Samantha Lee	samlee@email.com	(555) 111-2222
567	Lauren Brown	lbrown@email.com	(555) 666-7777
876	Michael Kim	mkim@hotmail.com	(555) 888-9999
654	Emily Chen	emilychen@yahoo.com	(555) 444-5555
789	Alex Wong	awong@hotmail.com	(555) 222-3333
456	Jason Park	jpark@example.com	(555) 333-4444

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ChatGPT was able to correctly label and format the data in a tabular format. It should be noted that this would be relatively difficult to achieve using a regular expression-based formatting function.

4. Translate the code into another language

How often do you need a solution to a programming problem, written in a particular language, but can find code in other languages? ChatGPT can help you translate any code into the language of your choice.

```
php Copy code

function encrypt($data, $key) {
    $iv = openssl_random_pseudo_bytes(16); // Generate a random IV (initialization vector)
    $encrypted = openssl_encrypt($data, 'aes-256-cbc', $key, OPENSSSL_RAW_DATA, $iv);
    return base64_encode($iv . $encrypted); // Concatenate the IV and encrypted data
}

function decrypt($data, $key) {
    $data = base64_decode($data); // Decode the Base64-encoded data
    $iv = substr($data, 0, 16); // Extract the IV from the first 16 bytes
    $encrypted = substr($data, 16); // Extract the encrypted data from the rest of the string
    $decrypted = openssl_decrypt($encrypted, 'aes-256-cbc', $key, OPENSSSL_RAW_DATA, $iv);
    return $decrypted;
}

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```

The screenshot above contains a PHP encryption and decryption function using AES-256 in CBC mode with a randomly generated initialization vector. The example asked ChatGPT to transcode to JavaScript and here is the result:

```
javascript Copy code

function encrypt(data, key) {
    const iv = crypto.randomBytes(16); // Generate a random IV (initialization vector)
    const cipher = crypto.createCipheriv('aes-256-cbc', Buffer.from(key), iv); // Create a cipher object
    let encrypted = cipher.update(data); // Encrypt the data
    encrypted = Buffer.concat([iv, encrypted, cipher.final()]); // Concatenate the IV and encrypted data
    return encrypted.toString('base64'); // Encode the result as Base64 and return
}

function decrypt(data, key) {
    const dataBuffer = Buffer.from(data, 'base64'); // Decode the Base64-encoded data
    const iv = dataBuffer.slice(0, 16); // Extract the IV from the first 16 bytes
    const encrypted = dataBuffer.slice(16); // Extract the encrypted data from the rest of the string
    const decipher = crypto.createDecipheriv('aes-256-cbc', Buffer.from(key), iv); // Create a decipher object
    let decrypted = decipher.update(encrypted); // Decrypt the data
    decrypted = Buffer.concat([decrypted, decipher.final()]); // Concatenate the IV and decrypted data
    return decrypted.toString(); // Convert the decrypted data to a string and return
}

TipsMake
```

Chatbot AI has been trained in many programming languages and can transcode between multiple languages with high accuracy. You can also move legacy or deprecated code to new, more stable code in the same language. All you need is to give ChatGPT the right prompt.

5. Optimizing a block of code

Whether you are building large resource-intensive applications or smaller projects, your code always needs a little optimization for better performance. ChatGPT is very helpful in optimizing code. You can prompt the AI chatbot to suggest ways to optimize a block of code or ask it to generate an optimized version of the code.

```
bash Copy code

function sumEvenNumbers(arr) {
  let sum = 0;
  for (let i = 0; i < arr.length; i++) {
    if (arr[i] % 2 === 0) {
      sum += arr[i];
    }
  }
  return sum;
}
```

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In the screenshot above, we have a JavaScript function that takes an array of numbers and returns the sum of all the even numbers in the array. The code works, but it may use some optimization methods. The example asked ChatGPT to optimize the code and this is the result.

```
javascript Copy code

function sumEvenNumbers(arr) {
  if (!Array.isArray(arr)) {
    throw new Error("Input must be an array");
  }
  return arr.reduce((sum, num) => {
    if (typeof num !== "number") {
      throw new Error("Array must only contain numbers");
    }
    if (num % 2 === 0) {
      return sum + num;
    }
    return sum;
  }, 0);
}
```

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ChatGPT will usually tell you what is wrong with the original code and the optimizations that have been made. For the code above, below is a screenshot of the optimization ChatGPT has done.

Optimizations made:

1. The function now checks if the input is an array and if it contains only numbers, throwing an error if not.
2. The function uses the reduce method to sum the even numbers in the array. This can be faster than using a for loop.
3. The function now returns the sum of all even and odd numbers.
4. The function uses the initial value of `sum`` as the second parameter of reduce, which is more efficient than modifying the value in each iteration.

Overall, the optimized function is more robust and efficient than the original implementation.

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Perhaps one of the coolest things about optimizing code with ChatGPT is that the chatbot will find holes in code that you might think is perfect. You can also ask the chatbot to optimize specific parts of your code to fit your unique needs.

6. Write tests for the code

One of the best ways to ensure your code is error-free, responds to a wide range of exceptions, and can handle tough cases, is to write unit tests for it. Of course, writing tests can sometimes be a time consuming and even confusing task. But why stress when ChatGPT can help?

Just copy-paste the code you want to write unit tests and give ChatGPT detailed instructions on how to write tests. Of course, the article does not recommend that you entrust the entire test writing process to ChatGPT.

7. Record your code

Code documentation can be a challenge, but it's also an important part of the software development process that shouldn't be overlooked. ChatGPT can create impressively detailed documentation of code in many programming languages. You can even ask it to generate the document in HTML format if you want to put it online.

In addition to standalone documentation, you can also ask the chatbot to comment on your code to make it easier for you or others to work with in the future. The example prompted ChatGPT to comment on a simple cryptographic function in Python that uses Caesar Cipher and it works properly on every line.

```
python Copy code
def encrypt(message, shift):
    """Encrypts a message using a Caesar Cipher with the specified shift."""
    # Initialize an empty string to hold the encrypted message
    encrypted_message = ""
    # Loop through each character in the message
    for char in message:
        # Check if the character is a letter
        if char.isalpha():
            # Shift the letter by the specified amount using Unicode code points
            # ord() converts the character to its Unicode code point
            # -97 converts the code point to a zero-based index (0 for 'a', 1 for 'b', etc.)
            # + shift applies the desired shift to the index
            # % 26 ensures that the index wraps around to the beginning of the alphabet
            # + 97 converts the shifted index back to a Unicode code point
            # chr() converts the code point back to a character
            shifted_char = chr((ord(char) - 97 + shift) % 26 + 97)
            # Append the shifted letter to the encrypted message
            encrypted_message += shifted_char
        else:
            # Leave non-letter characters unchanged
            encrypted_message += char
    # Return the encrypted message
```

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8. Fix any bugs

From misplaced brackets and commas to logical errors, ChatGPT can spot errors that could take you days to identify in seconds. Just copy-paste the problematic code and ask ChatGPT to identify the error in the code.

You may fear that you are dealing with logic errors, which are often more difficult to detect. If so, just paste the problematic code and describe to ChatGPT what you are trying to achieve with that code and the current output you are getting.

A good method for finding errors with ChatGPT is to provide as much detail about the error as possible. Relevant details may include the language, framework, and libraries your code uses, or details about the server on which you're running that code.

For example, to edit a piece of code in PHP, you may need to provide the associated database type, PHP version, server details, and the packages or libraries used.

9. Create code from scratch

One of the outstanding applications of ChatGPT is to generate computer code. Of course, you can always write each part of the program yourself. But everything will be fine if you entrust a small part to ChatGPT.

However, you should be cautious when using AI-generated code, even if it doesn't have syntax errors. Logic errors can be very costly if you deploy AI-generated code on critical software systems.

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