Programming Exercise 3.4

Making Change, v.1.0

Purpose. Learn how to write a rather lengthy program, by completing another, partially written one.

Write a program named **`changeDue1.py`** to calculate change due in a transaction using these U.S. bills – no cents:

For example, a "cash payment" of $45,000 is made by "tendering" a $100,000 bill. The "change due" is $55,000. It's "paid out" in five $10,000 bills, and one $5,000 bill.

In another example, a cash payment of $44,999 is made by tendering five $10,000 bills. The change due is $5,001. It's paid out in one $5,000 bill, and one $1 bill.

Requirements:

1. Write this program by copying, pasting, and completing the "starting point" provided below. Name the variables as you wish.

2. The "cash payment" is always less than or equal to the amount "tendered".

3. The "cash payment" cannot be zero or negative.

4. The paid out bills should include the *fewest* number of bills. That is, don't include *two* $10 bills when you can include *one* $20 bill instead.

5. Include a *label* with any statement that outputs a variable's value.

Algorithm. This is only a *partial* algorithm, to calculate the number of bills of a certain denomination to be paid out. For example, for $100 bills to be paid out:

```
Divide the change due by 100 to get the number of $100 bills in the change.
Recalculate the change due as the remainder in the above division problem.

...

Output the number of $100 bills, with a label.
```

Program I/O. Input: 2 programmer-assigned whole number values *of your choosing*, for the "cash payment" and for the amount "tendered" Output: The "change due" and the numbers of each specified denomination to be "paid out".

Example. The output should look something like this:

```
Cash payment amount: 45000
Tendered amount: 100000
Change due: 55000

Change paid out in:
  this many hundred thousand dollar bills: 0
  this many ten thousand dollar bills: 5
  this many five thousand dollar bills: 1
  this many thousand dollar bills: 0
  this many five hundred dollar bills: 0
  this many hundred dollar bills: 0
  this many fifty dollar bills: 0
  this many twenty dollar bills: 0
  this many ten dollar bills: 0
  this many five dollar bills: 0
  this many two dollar bills: 0
  this many one dollar bills: 0
```

Starting Point. Here is the partially written program that you are to complete:

```
int main()
{
  int cashPayment = 45000;
  int amountTendered = 100000;
  int changeDue = amountTendered - cashPayment;

  cout << "Cash payment amount: " << cashPayment;
  cout << "Tendered amount: " << amountTendered;
  cout << "Change due: " << changeDue;

  int hundredThousands = changeDue / 100000;
  changeDue = changeDue % 100000;

  int tenThousands = changeDue / 10000;
  changeDue = changeDue % 10000;
```

YOU COMPLETE THIS PART

```
  cout << "  this many two dollar bills: " << twos << endl;
  cout << "  this many one dollar bills: " << ones << endl;
}
```