

```
//-----  
// File:          Prog0.c  
//  
// Functions:     main(void)  
//  
//-----  
#include <stdio.h>  
#include <stdlib.h>  
#include <stdbool.h>  
#include <math.h>  
#define CENTS_IN_TWENTYDOLLARS 2000  
#define CENTS_IN_TENDOLLARS 1000  
#define CENTS_IN_FIVEDOLLARS 500  
#define CENTS_IN_ONEDOLLARS 100  
#define CENTS_IN_QUARTER 25  
#define CENTS_IN_DIME 10  
#define CENTS_IN_NICKLE 5  
#define CENTS_IN_PENNY 1  
#define ZERO 0  
#define ONE 1  
#define TOOBIG 999999999  
//-----  
// Function:      main(void)  
//  
// Title:         Change Counter  
//  
// Description:   The program will takes in a specific amount of dollars  
//               and the amount of tender. After that it will give the  
//               list amount of change in different type of bills  
//  
// Programmer:    Son Minh Tran  
//  
// Date:         01/17/2017  
  
// Version:      1.0  
//  
// Environment:  HP Elitebook 8570P  
//               Hardware: 8GB  
//               Intel(R) Core(TM) i5-3320M  
//               Software: OS: MS Windows 10 Professional 64-bit  
//  
// Input:        The amount of dollar for a purchase  
//               The amount of money tendered  
// Output:       Give out the amount of change  
//               Amount of twenty dollars  
//               Amount of ten dollars  
//               Amount of five dollars  
//               Amount of one dollar  
//               Amount of quarters  
//               Amount of dimes  
//               Amount of nickels  
//               Amount of pennies
```

```
//
// Parameters:      void
//
//
// Returns:         EXIT_SUCCESS for successful completion
//
//
// Called By:       None
//
// Calls:           None
//
// History Log:     Commit github on 01/05/2017: Initialize the project
//                  Commit github on 01/07/2017: Finished finding change
//                  Commit github on 01/17/2017: Change to deal with
//                  big number
//                  Commit github on 01/22/2017: release version 1.0
//-----
```

```
int main(void)
{
    //Declare and initialize all the variable
    long double purchaseAmount = 0.0L;
    long double moneyTendered = 0.0L;
    long double change = 0.0;
    _Bool invalidPur = false;
    _Bool invalidTend = false;
    int scanPur = 0;
    int scanTend = 0;
    int roundNumber = 100;
    double numberForRounding = 0.5;
    unsigned long long twentyBill = 0ULL;
    int tenBill = 0;
    int fiveBill = 0;
    int oneBill = 0;
    int quarterCoin = 0;
    int dimeCoin = 0;
    int nickelCoin = 0;
    int pennyCoin = 0;
    unsigned long long tempChangeInCent = 0ULL;
    //Print out to command line and ask for input of purchase and tender
    printf("Welcome to Change Counter by Son Tran!\n");
    printf("Please enter the total amount of purchase: $");
    //read in amount of purchase
    scanPur = scanf("%Lf", &purchaseAmount);
    //check for the input type
    invalidPur = scanPur != ONE;
    //Continue ask to enter input until it get correct type
    while (getchar() != '\n');
    while (invalidPur)
    {
        printf("Invalid purchase amount, input should be number, "
```

```

        "please enter again: $");
    scanf("%Lf", &purchaseAmount);
    while (getchar() != '\n');
    invalidPur = scanPur != ONE;
}
//round up to two number after the point of purchase amount
purchaseAmount = floor(purchaseAmount * roundNumber + numberForRounding)
    / roundNumber;
printf("%.2Lf\n", purchaseAmount);
//ask and read in tender amount
printf("Please enter amount of money tendered: $");
scanTend = scanf("%Lf", &moneyTendered);
//check for input type
invalidTend = scanTend != ONE;
//Continue ask to enter input until it get correct type
while (getchar() != '\n');
while (invalidTend)
{
    printf("Invalid tender amount, input should be number, "
        "please enter again: $");
    scanTend = scanf("%Lf", &moneyTendered);
    while (getchar() != '\n');
    invalidTend = scanTend != ONE;
}
//round of to two number after the point of purchase amount
moneyTendered = floor(moneyTendered * roundNumber + numberForRounding)
    / roundNumber;
printf("%.2Lf\n", moneyTendered);
printf("\n");
//calculate change amount
change = moneyTendered - purchaseAmount;
printf("Your change is: %.2Lf\n", change);
printf("\n");
change = floor(change * roundNumber + numberForRounding);
tempChangeInCent = fabs(change);
//check if the user is still owing or not
if (change < ZERO)
{
    printf("Change still owing\n");
}
//calculate amount of all types of bills
twentyBill = tempChangeInCent / CENTS_IN_TWENTYDOLLARS;
tempChangeInCent %= CENTS_IN_TWENTYDOLLARS;
tenBill = tempChangeInCent / CENTS_IN_TENDOLLARS;
tempChangeInCent %= CENTS_IN_TENDOLLARS;
fiveBill = tempChangeInCent / CENTS_IN_FIVEDOLLARS;
tempChangeInCent %= CENTS_IN_FIVEDOLLARS;
oneBill = tempChangeInCent / CENTS_IN_ONEDOLLARS;
tempChangeInCent %= CENTS_IN_ONEDOLLARS;
quarterCoin = tempChangeInCent / CENTS_IN_QUARTER;
tempChangeInCent %= CENTS_IN_QUARTER;
dimeCoin = tempChangeInCent / CENTS_IN_DIME;

```

```
tempChangeInCent %= CENTS_IN_DIME;
nickelCoin = tempChangeInCent / CENTS_IN_NICKLE;
tempChangeInCent %= CENTS_IN_NICKLE;
pennyCoin = tempChangeInCent / CENTS_IN_PENNY;
//print out amounts of all type of bills
printf("Twenties : %llu\n", twentyBill);
printf("Tens      : %d\n", tenBill);
printf("Fives     : %d\n", fiveBill);
printf("Ones      : %d\n", oneBill);
printf("Quarters  : %d\n", quarterCoin);
printf("Dimes     : %d\n", dimeCoin);
printf("Nickels   : %d\n", nickelCoin);
printf("Pennies   : %d\n", pennyCoin);
printf("-----\n");
printf("Thank you for using Change Counter.\nHave a nice day!\n");
//clean out all the buffer
while (getchar() != '\n');
//return successful message to the program
return EXIT_SUCCESS;
}
```