CSCI 2271 Computer Systems

Assignment 2: Pointers

Due Friday, February 1

PART A

What is the output of following programs? Briefly explain your answer.

1. **Program 1:**

```
# include <stdio.h>

void foo (int x)
{
  double a=100;
  double b=40;
  x =  a*a +4*b;

}

int main()
{
  int y = 20;
  foo (y);
  printf(”%d”, y);
  return 0;
}
```

2. **Program 2:**

```
# include <stdio.h>
void foo(int *ptr)
{
  double a=10;
  double b=4;
  *ptr =  a*a +4*b+5;

}

int main()
```

```
{
  int y = 20;
  foo(&y);
  printf(”%d”, y);

  return 0;
}
```

3. **Program 3:**

```
#include <stdio.h>

int main()
{
    double *ptr;
    double x;

    ptr = &x;
    *ptr = 10.254575;

    printf(” x = %0.2f\n”, x);
    printf(” *ptr = %f\n”, *ptr);

    *ptr += 10;
    printf(” x  = %f\n”, x);
    printf(” *ptr = %f\n”, *ptr);

    (*ptr)++;
    printf(” x = %0.4f\n”, x);
    printf(” *ptr = %0.4f\n”, *ptr);

    return 0;
}
```

4. **Program 4:**

```
#include<stdio.h>
void foo(int *p, int *q)
{
  int a=10;
  int b=5;
  p = q;
  *p = b*b+10*a;
}
int i = 0, j = 1;
int main()
{
  foo(&i, &j);
  printf(”%d %d \n”, i, j);
  getchar();
  return 0;
}
```

5. **Program 5:**

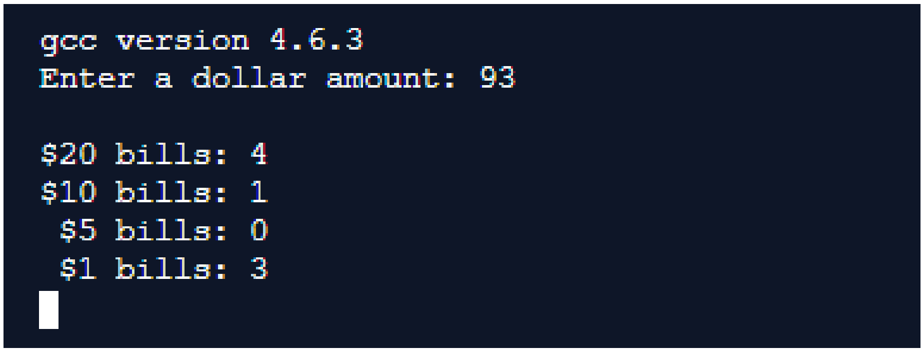
```
#include<stdio.h>

void swap (char *x, char *y)
{
    char *t = x;
    x = y;
    y = t;
}

int main()
{
    char *x = ”Computer Systems”;
    char *y = ”CSCI 2271”;
    char *t;
    swap(x, y);
    printf(”(%s, %s)\n”, x, y);
    t = x;
    x = y;
    y = t;
    printf(”(%s, %s)”, x, y);
    return 0;
}
```

PART B

Write a program named **dollar.c** that asks the user to enter a U.S. dollar amount and then shows how to pay that amount using the smallest number of $20, $10, $5, and $1 bills:



```
gcc version 4.6.3
Enter a dollar amount: 93

$20 bills: 4
$10 bills: 1
 $5 bills: 0
 $1 bills: 3
```

Hint: Divide the amount by 20 to determine the number of $20 bills needed, and then reduce the amount by the total value of the $20 bills. Repeat for the other bill sizes. Be sure to use integer values throughout, not floating-point numbers.

PART C

Modify the program in PART B (name the new program **dollarMod.c**) so that it includes the following function:

```
void pay_amount(int dollars, int *twenties, int *tens,
int *fives, int *ones);
```

The function determines the smallest number of $20, $10, $5, and $1 bills necessary to pay the amount represented by the dollars parameters. The twenties parameter points to a variable in which the function will store the number of $20 bills required. The tens, fives, and ones parameters are similar.

When you are finished with three parts, submit your files dollar.c , dollarMod.c and a file containing your answers to the programs in PART A to Canvas.