COP 3514 #1

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May 21, 2014

1. in the following examples,

   (a) `x = 7 + 3 * 6 / 2 - 1;`

   - 3 is multiplied by 6 to gain 18
   - 18 is divided by 2 to gain 9
   - 9 is added to 7 to gain 16
   - 1 is subtracted from 16 to gain 15 as the final result

   (b) `x = 2 % 2 + 2 * 2 - 2 / 2;`

   - 2 modulo 2 to gain 0
   - 2 is multiplied by 2 to gain 4
   - 2 is divided by 2 to gain 1
   - 1 is subtracted from 4 to gain 3 as the final result

   (c) `x = ( 3 * 9 * ( 3 + ( 9 * 3 / ( 3 ) ) ) );`

   - (3) is evaluated to 3
   - the innermost 9 is multiplied by 3 to gain 27
   - 27 is divided by 3 to gain 9
   - 3 is added to 9 to gain 12
   - 3 is multiplied by 9 to gain 27
   - 27 is multiplied by 12 to gain 324 as the final result

2. hw1_arithmetic.c

```c
#include <stdio.h>

// takes two integers and prints sum, product, difference, quotient
// and remainder
int main() {
    int a, b;
    printf("Enter two integers: \n");
    scanf("%d%d", &a, &b);
    printf("The sum of %d and %d is %d \n", a, b, a + b);
    printf("The product of %d and %d is %d \n", a, b, a * b);
    printf("The difference of %d and %d is %d \n", a, b, a - b);
    printf("The quotient of %d and %d is %d \n", a, b, a / b);
    printf("The remainder of %d and %d is %d \n", a, b, a % b);
    return 0;
}
```

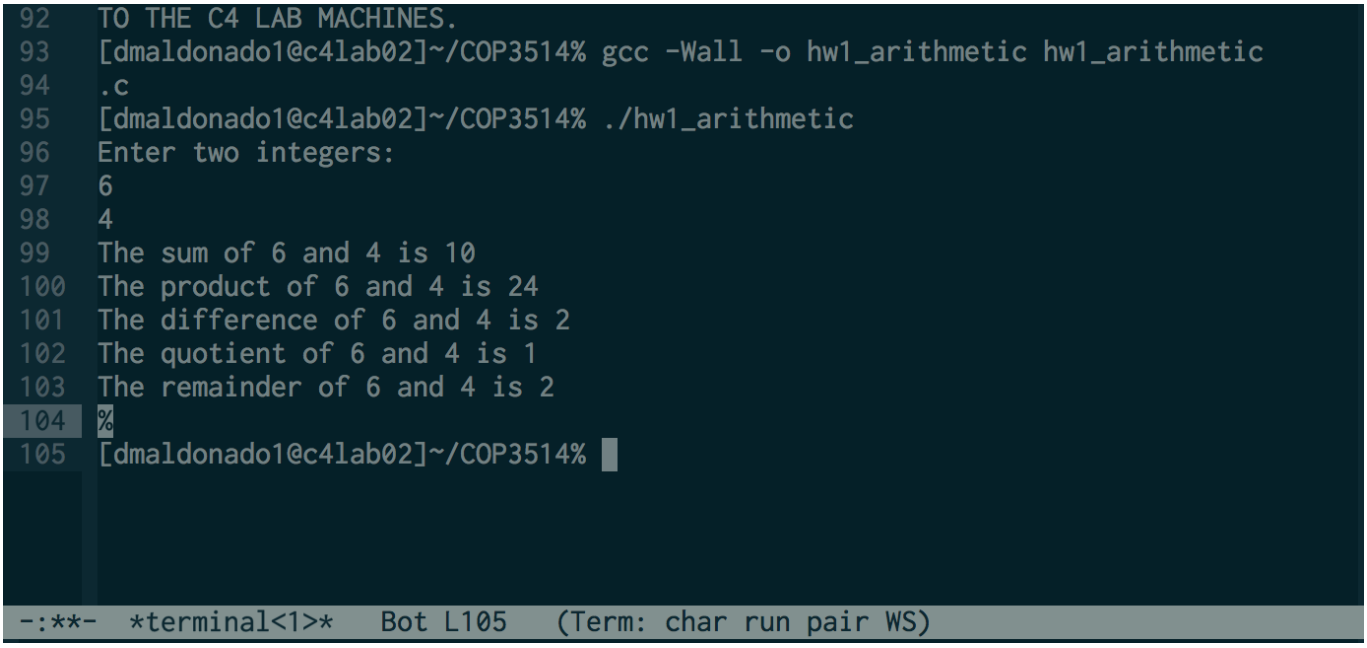

Figure 1: solution for problem 2 compiling and running

3. hw1_circle.c

```c
#include <stdio.h>
#include <math.h>
#define PI 3.14159

// takes float radius of circle and prints diameter, circumference
// and radius
int main() {
    float rad;
    printf("Enter radius of circle: \n");
    scanf("%f", &rad);
    printf("The diameter of the circle is: %f \n", rad * 2);
    printf("The circumference of the circle is: %f \n", 2 * PI * rad);
    printf("The area of the circle is: %f \n", PI * pow(rad, 2));
    return 0;
}
```

```
321
322
323  [dmaldonado1@c4lab02]~% ls
324  COP3514  Readme.pdf  ReadmeLinux.txt  ReadmeWindows.txt  public_html
325  [dmaldonado1@c4lab02]~% cd COP3514
326  [dmaldonado1@c4lab02]~/COP3514% ls
327  count_chars    hello_world.c     hw1_circle.c
328  count_chars.c  hw1_arithmetic    max_val_numbers
329  hello_world    hw1_arithmetic.c  max_val_numbers.c
330  [dmaldonado1@c4lab02]~/COP3514% gcc -Wall -o hw1_circle hw1_circle.c
331  [dmaldonado1@c4lab02]~/COP3514% ./hw1_circle
332  Enter radius of circle:
333  10
334  The diameter of the circle is: 20.000000
335  The circumference of the circle is: 62.831800
336  the area of the circle is: 314.159000
337  [dmaldonado1@c4lab02]~/COP3514%
-:**-  *terminal<1>*   Bot L337   (Term: char run pair WS)
```

Figure 2: solution for problem 3 compiling and running

4. hw_separate_digits.c

```c
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

// returns length of integer
int intLen(int input) {
    return floor(log10(abs(input))) + 1;
}

// takes integer from stdin and prints it separated by three spaces
// between each digit
int main() {
    int num, div;

    printf("Enter integer: \n");
    scanf("%d", &num);

    // makes power of 10 divisor, e.g. for num 2345 div is 1000,
    // for 345 div is 100, and so on
    div = 1;
    for (int i = 0; i < intLen(num) - 1; i++) {
        div *= 10;
    }

    while (num > 0) {
        int digit = num / div;
        printf("%d   ", digit);
        num %= div;
        div /= 10;
    }
    printf("\n");
    return 0;
}
```

Figure 3: solution for problem 4 compiling and running

5. hw1_var_swap.c

```c
#include <stdio.h>

// demonstration of swapping two variables
int main() {
    int a, b, temp;
    printf("Enter first integer value: \n");
    scanf("%d", &b);
    printf("\n");
    printf("The value of the first variable \"a\" is %d \n", a);
    printf("and the value of the second variable \"b\" is %d \n", b);
    printf("\n");

    temp = a;
    a = b;
    b = temp;

    printf("After the swap the value of the first variable \"a\" is %d \n", a);
    printf("and the value of the second variable \"b\" is %d \n", b);
    return 0;
}
```

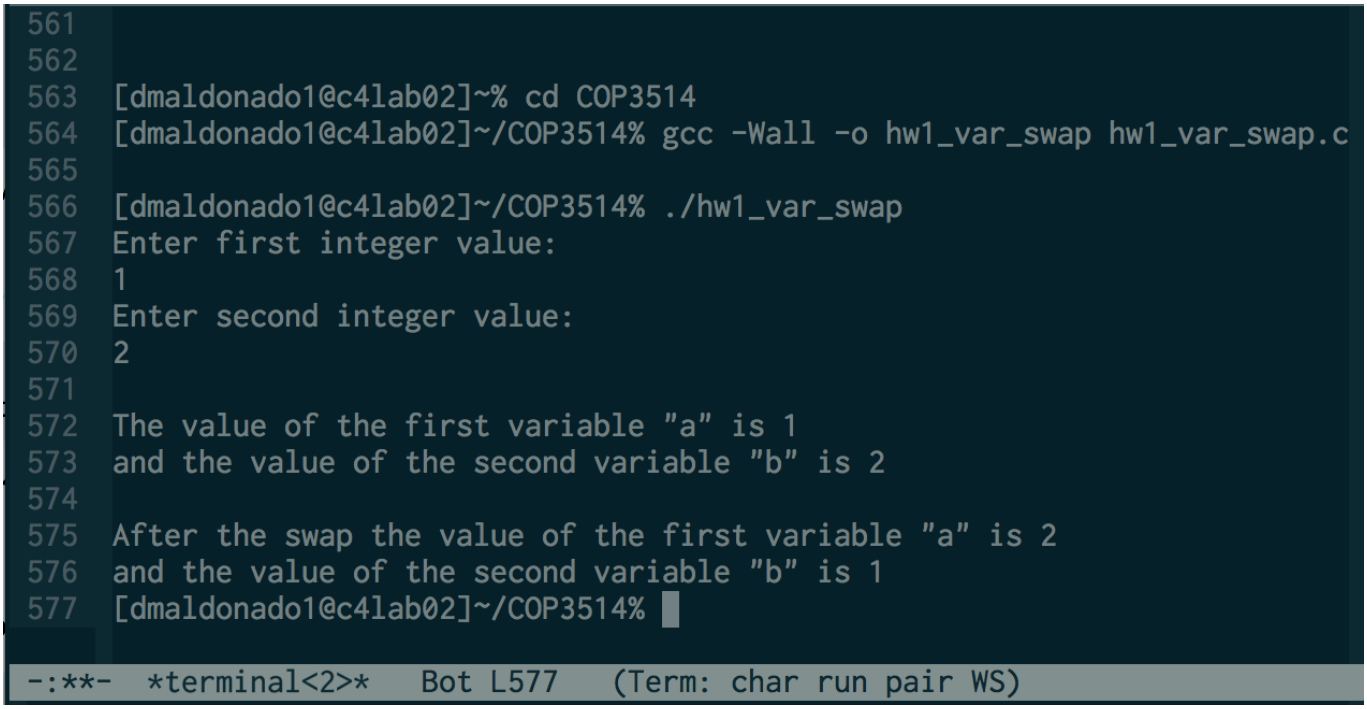

Figure 4: solution for problem 5 compiling and running

6. (a) The solution for problem 5 used 3 variables.

(b) hw1_var_swap2.c

```c
#include <stdio.h>

// demonstration of swapping two variables using only two variables
int main() {
    int a, b;

    printf("Enter first integer value: \n");
    scanf("%d", &a);
    printf("Enter second integer value: \n");
    scanf("%d", &b);
    printf("\n");
    printf("The value of the first variable \"a\" is %d \n", a);
    printf("and the value of the second variable \"b\" is %d \n", b);
    printf("\n");

    a = a + b;
    b = a - b;
    a = a - b;

    printf("After the swap the value of the first variable \"a\" is %d \n", a);
    printf("and the value of the second variable \"b\" is %d \n", b);
```

```
    return 0;
}
```

```
167  hw1_arithmetic  hw1_separate_digits.c
168  [dmaldonado1@c4lab02]~/COP3514% gcc -Wall -o hw1_var_swap2 hw1_var_swap2
169  .c
170  [dmaldonado1@c4lab02]~/COP3514% ./hw1_var_swap2
171  Enter first integer value:
172  10
173  Enter second integer value:
174  20
175
176  The value of the first variable "a" is 10
177  and the value of the second variable "b" is 20
178
179  After the swap the value of the first variable "a" is 20
180  and the value of the second variable "b" is 10
181  [dmaldonado1@c4lab02]~/COP3514%
-:**-  *terminal<1>*   Bot L181   (Term: char run pair WS)
```

Figure 5: solution for problem 6 compiling and running