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Computer Programming 143

Practical 3- Memo

2016

Assignment 3A

```c
/* Filename: Assignment3A.c
* Date: 2016/01/01
* Name: Doe J.J.
* Student number: 12345678
* ------------------------------------------------------
* By submitting this file electronically, I declare that
* it is my own original work, and that I have not copied
* any part of it from another source.
* ------------------------------------------------------
* This program gives the option to do different
* mathematical operations to two numbers.
* ------------------------------------------------------
*/
#include <stdlib.h>
#include <stdio.h>

int main()
{
  int choice, num1, num2;

  setbuf(stdout,0);

  // print a menu which gives the option to do one of
  // 5 mathematical operations (+,-,*,/,%)
  printf("\nMenu of Operation\n-------------");
  printf("\n1.  +\n2.  -\n3.  *\n4.  /\n5.  %%");
  printf("\nEnter operation number to be executed: ");
  scanf("%d", &choice); // user enters which operation to do

  // get numbers for calculation
  printf("Enter first integer: ");
  scanf("%d", &num1);
  printf("Enter second integer: ");
  scanf("%d", &num2);

  // do and display appropriate calculation according to which
  // menu option user have chosen
  switch(choice){
  case 1:
    printf("%d + %d = %d", num1, num2, num1+num2);
    break;
  case 2:
    printf("%d - %d = %d", num1, num2, num1-num2);
    break;
  case 3:
```

```
46      printf("%d * %d = %d", num1, num2, num1*num2);
47      break;
48    case 4:
49      printf("%d / %d = %d", num1, num2, num1/num2);
50      break;
51    case 5:
52      printf("%d %% %d = %d", num1, num2, num1%num2);
53      break;
54    }
55
56    return 0;
57  }
```

Assignment 3B

```c
/* Filename: Assignment3B.c
* Date: 2016/01/01
* Name: Doe J.J.
* Student number: 12345678
* ------------------------------------------------------
* By submitting this file electronically, I declare that
* it is my own original work, and that I have not copied
* any part of it from another source.
* ------------------------------------------------------
* The program aims to use Newton-Raphson Method to
* obtain the approximation of an equation
* ------------------------------------------------------
*/
#include <stdlib.h>
#include <stdio.h>
#include <math.h>

int main ()
{
  double x;
  double x1;
  double fx;
  double fdx;
  int iterations = 0;
  int maxit;
  double ermarg;
  double error;

  setbuf(stdout, 0);

  printf("f (x) = 1.2x(x) - 2.5x - 7");
  // Ask for first approximation of x
  printf("\nApproximate the first value of x:");
  scanf("%lf", &x);               // Reads users answer

  while(x <= 4)
  {
    // Test whether users input is above 4,
    // otherwise it will loop and ask again
    printf("\nApproximate the first value of x:");
    scanf("%lf", &x);
  }

// Ask the user to enter the error margin
  printf("Enter the error margin:");
```

```
46    scanf("%lf", &ermarg);  // Reads users answer
47
48    // Asks the user for the maximum number of iterations
49    printf("Enter the maximum number of iterations:");
50    scanf("%d", &maxit);                // Reads users answer
51
52    printf("x = %2.f \n", x);           // Prints the first value of x
53    do{
54      fx = 1.2*pow(x,2)-2.5*x-7;  // Calculates f(x)
55      fdx = 2.4*x - 2.5;  // Calculates the derivatives of f(x)
56      x1 = x - fx/fdx;  // Uses Newton's method to calculate x
57      error = fabs(1.2*pow(x1,2)-2.5*x1-7); // The error is the absolute value of f(x1)
58      printf("x%d = %.2f \n", iterations, x1);  // Prints the iteration value of x1
59
60      x = x1; // Update x for next iteration
61      iterations++; // Increase the number of iterations by 1
62
63    }while((iterations <= maxit) && (error>ermarg));
64
65    return 0;
66  }
```

Assignment 3C

```c
/* Filename: Assignment3C.c
* Date: 2016/01/01
* Name: Doe J.J.
* Student number: 12345678
* ------------------------------------------------------
* By submitting this file electronically, I declare that
* it is my own original work, and that I have not copied
* any part of it from another source.
* ------------------------------------------------------
* This program determines whether a supplied number is a
* prime number.
* ------------------------------------------------------
*/
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

int main()
{
  int flag = 0; // Indicate if number was divisable - stops testing (the loop)
  int divisor = 2;  // Start prime test by checking divisibility by 2
  int num, modulo;

  setbuf(stdout, 0);

  // Allow user to enter integer to be tested if it is prime
  printf("Enter an integer.  I will determine if it is a prime: ");
  scanf("%d", &num);

  // loop through all possible divisors fo the number up to
  // and including its square but stop if the number has
  // successfully been divided, i.e. once it could be
  // divided do not continue testing the rest of the possible divisors
  while((divisor < sqrt(num)) && (flag == 0))
  {
    modulo = num%divisor;
    printf("\n%d mod %d = %d", num, divisor, modulo);
    // was it dividible?
    if(modulo==0)
    {
      flag = 1; // yes, is is dividible, stop the loop
    }
    divisor++;  // next possible divisor of number
  }

```

```
46    if(flag)
47    {
48      printf("\n%d is not a prime.", num);
49    }
50    else
51    {
52      printf("\n%d is a prime.", num);
53    }
54
55    return 0;
56  }
```