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Computer Programming 143

Practical 4- Memo

2016

Assignment 4A

```c
/* Filename: Assignment4A.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 asks the user for resistor
* values and voltage source and calculates the current
* ------------------------------------------------------
*/
#include <stdio.h>
#include <stdlib.h>

int main (void)
{
        // initialise variables
        double res1, res2;
        double volt;

        setbuf(stdout, 0);      // Eclipse fix for scanf

        // Ask user for values
        printf("One resistor may be zero; neither may be negative;\nvoltage must be g
        printf("Value for Resistor 1 (units: Ohm): ");
        scanf("%lf", &res1);
        printf("Value for Resistor 2 (units: Ohm): ");
        scanf("%lf", &res2);
        printf("Value for Voltage Source (units: V): ");
        scanf("%lf", &volt);

        // Check if values are valid, if no request new values
        while(((res1==0.0)&&(res2==0.0))||(volt<=0)||(res1<0.0)||(res2<0.0))
        {
                printf("ERROR form user input, please try again\n");

                printf("Value for Resistor 1 (units: Ohm): ");
                scanf("%lf", &res1);
                printf("Value for Resistor 2 (units: Ohm): ");
                scanf("%lf", &res2);
                printf("Value for Voltage Source (units: V): ");
                scanf("%lf", &volt);
        }
```

```
46
47          // Calculate current and display result
48          printf("For a series circuit the current is %0.4f (units: A)", volt/(res1+res
49
50          return 0;
51  }
```

Assignment 4B

```c
/* Filename: Assignment4B.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 defines functions to add and subtract
* values
* ------------------------------------------------------
*/
#include <stdio.h>
#include <stdlib.h>

// all the function prototypes
void add (int x, int y);
void subtract (int x, int y);
void addSubtract (int x, int y, int z, int k);

int main (void)
{
        // all the function calls
        add(2, 2);
        subtract(10,1);
        addSubtract(3,7,8,2);
        add(24, 100);

        return 0;
}

// function definition of add
void add (int x, int y)
{
        // calculate and display sum of arguments
        printf("\nThe function called add() is starting.\n");
        printf("It adds the two integers that are sent to it: %d + %d = %d\n", x, y, x
        printf("The function called add() is ending.\n");
}

// function definition of subtract
void subtract (int x, int y)
{
        // calculate and display difference of arguments
```

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        printf("\nThe function called subtract() is starting.\n");
        printf("It subtracts the two integers that are sent to it: %d - %d = %d\n", x
        printf("The function called subtract() is ending.\n");
}

// function definition of addSubtract
void addSubtract (int x, int y, int z, int k)
{
        // uses other functions to determine sum and difference of arguments
        printf("\nThe function called addSubtract() is starting.\n");
        printf("It adds the first integers and subtracts the last two of the four inte
        printf("It subcontracts its works ;)\n");
        add(x, y);      // function call
        subtract(z, k); // function call
        printf("\nThe function called addSubtract() is ending.\n");
}
```

Assignment 4C

```c
/* Filename: Assignment4B.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 defines functions to perform a number of
* different unit conversions
* ------------------------------------------------------
*/
#include <stdio.h>

// function prototypes
double wattHr2joule(double wattHr);
double joule2wattHr(double joule);
double inch2cm(double inch);
double cm2inch(double cm);
double hp2kW(double hp);
double kW2hp(double kW);
int time2sec(int time);
int time2min(int time);
int time2hr(int time);

int main()
{
        char option;    // user selected option
        double value;   // value to be converted
        int time;       // time value

        setbuf(stdout, 0);

        // print menu and request option from user
        printf("***Conversion Menu***\n");
        printf("a.\tWh2Joule\nb.\tJoule2Wh\nc.\tInch2Cm\nd.\tCm2Inch\ne.\tHp2Kw\nf.\t
        printf("Select a valid option:\n");
        scanf(" %c", &option);

        // determine whether exit option was chosen
        while(option != 'x')
        {
                // switch case to investigate valid input
                switch(option)
```

```
46                  {
47                  case 'a':
48                          // ask user for value
49                          printf("Enter the value (Wh):\n");
50                          scanf("%lf", &value);
51                          printf("Your answer is (J):\n");
52                          // print result of conversion
53                          printf("%lf J\n", wattHr2joule(value));
54                          break;
55
56                  case 'b':
57                          // ask user for value
58                          printf("Enter the value (J):\n");
59                          scanf("%lf", &value);
60                          printf("Your answer is (Wh):\n");
61                          // print result of conversion
62                          printf("%lf Wh\n", joule2wattHr(value));
63                          break;
64
65                  case 'c':
66                          // ask user for value
67                          printf("Enter the value (inch):\n");
68                          scanf("%lf", &value);
69                          printf("Your answer is (cm):\n");
70                          // print result of conversion
71                          printf("%lf cm\n", inch2cm(value));
72                          break;
73
74                  case 'd':
75                          // ask user for value
76                          printf("Enter the value (cm):\n");
77                          scanf("%lf", &value);
78                          printf("Your answer is (inch):\n");
79                          // print result of conversion
80                          printf("%lf inch\n", cm2inch(value));
81                          break;
82
83                  case 'e':
84                          // ask user for value
85                          printf("Enter the value (Hp):\n");
86                          scanf("%lf", &value);
87                          printf("Your answer is (kW):\n");
88                          // print result of conversion
89                          printf("%lf kW\n", hp2kW(value));
90                          break;
91
92                  case 'f':
```

```
93                          // ask user for value
94                          printf("Enter the value (kW):\n");
95                          scanf("%lf", &value);
96                          printf("Your answer is (Hp):\n");
97                          // print result of conversion
98                          printf("%lf Hp\n", kW2hp(value));
99                          break;
100
101                 case 'g':
102                         // ask user for value
103                         printf("Enter the value (seconds):\n");
104                         scanf("%d", &time);
105                         printf("Your answer is (hh:mm:ss):\n");
106                         // print result of conversion
107                         printf("%d:%d:%d\n", time2hr(time), time2min(time), time2sec(
108                         break;
109
110                 }
111
112                 // print menu and request option from user
113                 printf("\n***Conversion Menu***\n");
114                 printf("a.\tWh2Joule\nb.\tJoule2Wh\nc.\tInch2Cm\nd.\tCm2Inch\ne.\tHp2
115                 printf("Select a valid option:\n");
116                 scanf(" %c", &option);
117         }
118         printf("\nGoodbye!");
119         return 0;
120 }
121
122 // function definitions of all the conversion functions
123 double wattHr2joule(double wattHr)
124 {
125         return (wattHr*60.0*60.0);
126 }
127
128 double joule2wattHr(double joule)
129 {
130         return (joule/60.0/60.0);
131 }
132
133 double inch2cm(double inch)
134 {
135         return (inch*2.54);
136 }
137
138 double cm2inch(double cm)
139 {
```

```
140         return (cm/2.54);
141 }
142
143 double hp2kW(double hp)
144 {
145         return (hp*0.746);
146 }
147
148 double kW2hp(double kW)
149 {
150         return (kW/0.746);
151 }
152
153 int time2sec(int time)
154 {
155         // using modulus
156         return (time%(60*60*60));
157 }
158
159 int time2min(int time)
160 {
161         // using modulus and then integer division
162         return (time%(60*60)/60);
163 }
164
165 int time2hr(int time)
166 {
167         // using integer division
168         return (time/60/60);
169 }
```