**CSC201: SELF-CHECK EXERCISES TILL LECTURE 11**

1. The table below shows the normal boiling points of several substances. Write a program that prompts the user for the observed boiling point of a substance in ºC. The program then identifies the substance if the observed boiling point is within 5% (more or less) of the expected boiling point. If the data input is more than 5% higher or lower than any of the boiling points in the table, the program should output the message “Substance unknown”.

Substance Expected Boiling Point (ºC)

Water 100

Mercury 357

Copper 1187

Silver 2193

Gold 2660

1. Write a program that calculates and prints the bill for Riyadh’s power consumption. The rates vary depending on whether the user is residential, commercial, or industrial. A code of R corresponds to a Residential, C corresponds to a Commercial, and I to Industrial. Any other code should be treated as an error. The program should read the power consumption rate in KWH (Kilowatt per Hour); then it calculates the due amount according to the following:

The rate is SAR 5 per KWH for Residential, SAR 10 per KWH for Commercial

and SAR 20 per KWH for Industrial.

1. There are 9,870 people in a town whose population increases by 10 percent each year. Write a loop that displays the annual population for ten consecutive years. The program should also write a message “over population” if the population exceeds 30,000.
2. The table below shows the normal boiling points of several substances. Write a program that prompts the user to enter 1000 observed boiling points of a substance in ºC. The program then identifies the substance if the observed boiling point is within 5% (more or less) of the expected boiling point. If the data input is more than 5% higher or lower than any of the boiling points in the table, the program should output the message “Substance unknown”.

Substance Expected Boiling Point (ºC)

Water 100

Mercury 357

Copper 1187

Silver 2193

Gold 2660

1. Write a program that calculates and prints the bill for Riyadh’s power consumption for 100 customers. The rates vary depending on whether the user is residential, commercial, or industrial. A code of R corresponds to a Residential, C corresponds to a Commercial, and I to Industrial. Any other code should be treated as an error.

The program should read the power consumption rate in KWH (Kilowatt per Hour); then it calculates the due amount according to the following:

The rate is SAR 5 per KWH for Residential, SAR 10 per KWH for Commercial and SAR 20 per KWH for Industrial.

8. Given the following program:

#include <stdio.h>

Int main (void)

{

 double total\_pay, rate, hours, pay;

 int count\_emp, number\_emp;

 printf (“enter the number of employees\n”);

 scanf (“%d”, number\_emp);

 total\_pay = 0; //accumulator variable initialized

 count\_emp = 0;

 while (count\_emp < number\_emp)

 {

 printf (“hours> “);

 scanf (“%f”, &hours);

 printf (“rate> “);

 scanf (“%f”, &rate);

 pay = hours \* rate;

 printf (“pay is SR%6.2f\n”, pay);

 count\_emp++; //count\_emp = count\_emp + 1;

 total\_pay = total\_pay + pay; // total\_pay += pay;

 } // end of while loop

 printf (“\n all employees processed\n”);

 printf (“total payroll is sr%8.2f\n”, total\_pay);

 return (0);

} //end of main

Trace the previous program for the following input:

|  |  |  |  |
| --- | --- | --- | --- |
| number of employees | emp. # | hours | rate (in sr) |
| 3 | 1 | 50 | 5.25 |
|  | 2 | 6 | 5.00 |
|  | 3 | 15 | 7.00 |

By completing the following output table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| number\_emp | count\_emp | count\_emp < number\_emp | hours | rate | pay | total\_pay |

1. There are 9,870 people in a town whose population increases by 10 percent each year. Write a loop that displays the annual population. The program should stop and write a message “over population” if the population exceeds 30,000.
2. Write a program that calculates and prints the bill for Riyadh’s power consumption. The rates vary depending on whether the user is residential, commercial, or industrial. A code of R corresponds to a Residential, C corresponds to a Commercial, and I to Industrial. Any other code should be treated as an error. The program should read the power consumption rate in KWH (Kilowatt per Hour); then it calculates the due amount according to the following: The rate is SAR 5 per KWH for Residential, SAR 10 per KWH for Commercial and SAR 20 per KWH for Industrial. The program should display the number of users of each type. Use a sentinel to stop the data entry.
3. Write a complete program that displays a menu to perform an arithmetic operation between two non-integer numbers. The user should select one of the following symbols: +, -, \*, /, and %. The menu should contain a sentinel to exit from the program.
4. Write a complete program that allows the user to enter values and prints out number of positive values, and the number of negative values entered. In your program, use a sentinel-controlled loop using zero as the sentinel value.
5. Update the program written in Example (3) (Refer to lecture 11. Nested Loops) so that to do the following:
6. The user ends the courses entry using a sentinel
7. The user ends the data entry of students using a sentinel
8. Calculate the GPA of each student accordingly
9. Calculate the average of GPAs for all students
10. Show the output displayed by the following nested loops:

for (i = 0; i < 2; ++i)

 {

 printf (“outer %4d\n”, i);

 for (j = 0; j < 3; ++j)

 {

 printf (“~~~~~inner%3d%3d\n”, i, j);

 }

 for (k = 2; k > 0; --k)

 printf (“~~~~~inner%3d%3d\n”, i, k);

 }

1. Write a program that displays the multiplication table for numbers 0 to 9.
2. Design an interactive input loop that scans pairs of integers until it reaches a pair in which the first integer evenly divides the second.