WEEK 2 PRACTICE QUESTIONS – BASIC C AND CONTROL FLOW

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Questions

1. (**classifyChar**) Write a C program that reads an input character from the user and prints a message to state whether the character is an uppercase letter, a lowercase letter or a digit.

   A sample program is given below:

```c
#include <stdio.h>
int main()
{
   char ch;

   printf("Enter a character: \n");
   scanf("%c", &ch);

   /* Write your code here */

   return 0;
}
```

   Sample input and output sessions are given below:

   (1) Test Case 1
```
Enter a character:
A
Upper case letter
```

   (2) Test Case 2
```
Enter a character:
a
Lower case letter
```

   (3) Test Case 3
```
Enter a character:
1
Digit
```

2. (**computeNetPay**) Write a C program that reads the hours an employee worked in a week, computes the gross pay and income tax, and prints the gross pay, income tax and net pay on the screen. Assume that the pay structure and tax rate are given as follows: (1) the basic pay rate is $6.00 per hour; (2) the over-time pay rate (in excess of 40 hours) is one and a half time of the basic pay rate; and (3) the tax rate is 10\% of the first $1000 of the gross pay, 20\% of the next $500 and 30% of the rest.

   A sample program is given below:

```c
#include <stdio.h>
int main()
{
   int hours;
   float tax, grossPay, netPay;

   printf("Enter hours of work: \n");
   scanf("%d", &hours);
```

```
    /* Write your program code here */

    printf("Gross pay = %.2f\n", grossPay);
    printf("Tax = %.2f\n", tax);
    printf("Net pay = %.2f\n", netPay);
    return 0;
}
```

Sample input and output sessions are given below:

(1) Test Case 1:

```
Enter hours of work:
37
Gross pay = 222.00
Tax = 22.20
Net pay = 199.80
```

(2) Test Case 2:

```
Enter hours of work:
50
Gross pay = 330.00
Tax = 33.00
Net pay = 297.00
```

3. (**computeSalaryGrade**) The salary scheme for a company is given as follows:

Salary range for grade A: $700 - $899
Salary range for grade B: $600 - $799
Salary range for grade C: $500 - $649

In addition, a person whose salary is between $600 and $649 is in grade C if his merit points are below 10, otherwise he is in grade B. A person whose salary is between $700 and $799 is in grade B if his merit points are below 20, otherwise he is in grade A. Write a program to read in a person's salary and his merit points, and displays his grade.

A sample program is given below:

```
#include <stdio.h>
int main()
{
    int salary, merit;

    printf("Enter the salary: \n");
    scanf("%d", &salary);
    printf("Enter the merit: \n");
    scanf("%d", &merit);

    /* Write your program code here */

    return 0;
}
```

Sample input and output sessions are given below:

(1) Test Case 1:

```
Enter the salary:
700
Enter the merit:
20
The grade: A
```

(2) Test Case 2:

```
Enter the salary:
500
Enter the merit:
20
The grade: C
```

4. (**computeCarPrice**) Write a program to calculate the actual cost of buying a car in Singapore. Your program should input the list price and the category of a car, and print out the actual cost. Based on the list price, assuming that the car dealer will give a discount of 10%. You should also consider that there is a 10% luxury tax on the amount over $100,000 (after the discount), and that the G.S.T. tax is 3%. All taxes are computed based on the discounted price. Certificate of Entitlement (COE) must be obtained for every car in Singapore. The amount you bid for the COE is based on the category your car belongs to. COE is not taxed. The categories and their COE prices are given below:

(1) Car (1600 c.c. & below) & Taxi: COE = 70,000
(2) Car (above 1600 c.c.): COE = 80,000
(3) Goods Vehicle & Bus: COE = 23,000
(4) Motorcycle - COE: 600

A sample program is given below:

```c
#include <stdio.h>
int main()
{
   int list, coe = 0, cat;
   double discounted, luxury = 0, gst, total;

   printf("Please enter the list price: \n");
   scanf("%d", &list);
   printf("Please enter the category: \n");
   scanf("%d", &cat);

   /* Write your program code here */

   printf("Total price is $%.2lf\n", total);
   return 0;
}
```

Sample input and output sessions are given below:

(1) Test Case 1:

```
Please enter the list price:
30000
Please enter the category:
1
Total price is $97810.00
```

(2) Test Case 2:

```
Please enter the list price:
50000
Please enter the category:
2
Total price is $126350.00
```

5. (**printMultiTable**) Write a C program that asks the user to input a positive number between 1 and 9, reads the number from the user and prints the multiplication table of the input number.

A sample program is given below:

```c
#include <stdio.h>
int main()
{
   int row, col;
   int i, input;

   printf("Enter an input number (between 1 and 9): \n");
   scanf("%d", &input);
   printf("Multiplication Table: \n");

   /* Write your code here */

   return 0;
}
```

Sample input and output sessions are given below:

(1) Test Case 1

```
Enter an input number (between 1 and 9):
5
Multiplication Table:
                1       2       3       4       5
        1       1
        2       2       4
        3       3       6       9
        4       4       8       12      16
        5       5       10      15      20      25
```

(2) Test Case 2

```
Enter an input number (between 1 and 9):
3
Multiplication Table:
                1       2       3
        1       1
        2       2       4
        3       3       6       9
```