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CS AI (C)

Lab # 3

Task 1:

Write a program that prompts the user to input a number. The program should then output the number and a message saying whether the number is positive, negative, or zero.

Solution:

```cpp
#include<iostream>
using namespace std;
int main(){
    int num;
    cout<<"Enter any number: "<<endl;
    cin>>num;
    if (num > 0){
        cout<<"The number "<<num<<" is a positive number";
    }
    else if (num == 0 ){
        cout<<"The number "<<num<<" is a equal to zero";
    }
    else if (num < 0){
        cout<<"The number " <<num<<" is negative number";
    }
 cout<<endl;
 system("PAUSE");
 return 0; }
```

Output:

```
Enter any number:
-9
The number -9 is negative number
Press any key to continue . . .
```

Task 2:

Write a program that prompts the user to input three numbers. The program should then output the numbers in ascending order.

Solution:

```cpp
#include <iostream>
using namespace std;
int main() {
    int a, b, c;

    cout << "Enter three numbers: ";
    cin >> a >> b >> c;

    if (a <= b && b <= c) {
        cout << a << " " << b << " " << c;
    }
    else if (a <= c && c <= b) {
        cout << a << " " << c << " " << b;
    }
    else if (b <= a && a <= c) {
        cout << b << " " << a << " " << c;
    }
    else if (b <= c && c <= a) {
        cout << b << " " << c << " " << a;
    }
    else if (c <= a && a <= b) {
        cout << c << " " << a << " " << b;
    }
    else {
        cout << c << " " << b << " " << a;
    }
    cout<<endl;
    system("PAUSE");
    return 0;
}
```

Output:

```
Enter Three numbers: 7
2
9
2 7 9
Press any key to continue . . .
```

Task 3:

In a right triangle, the square of the length of one side is equal to the sum of the squares of the lengths of the other two sides. Write a program that prompts the user to enter the lengths of three sides of a triangle and then outputs a message indicating whether the triangle is a right triangle.

Solution:

```cpp
#include<iostream>
using namespace std;
int main(){
    int a,b,c;
    cout<<"enter first side length ";
    cin>>a;
    cout<<"enter second side length ";
    cin>>b;
    cout<<"enter third side length ";
    cin>>c;

    if ( a*a == ((b*b) + (c*c))){
        cout<<"it is a right angle triangle";
        }
    else if ( b*b == ((a*a) + (c*c))){
        cout<<"it is a right angle triangle";
        }
    else if ( c*c == ((b*b) + (a*a))){
        cout<<"it is a right angle triangle";
        }
    else{
        cout<<"it is NOT a right angle triangle";
        }


 cout<<endl;
 system("PAUSE");
 return 0;
}
```

Output:

```
enter first side length 5
enter second side length 4
enter third side length 3
it is a right angle triangle
Press any key to continue . . .
```

Task 4:

A bank in your town updates its customers' accounts at the end of each month. The bank offers two types of accounts: savings and checking. Every customer must maintain a minimum balance. If a customer's balance falls below the minimum balance, there is a service charge of $10.00 for savings accounts and $25.00 for checking accounts. If the balance at the end of the month is at least the minimum balance, the account receives interest as follows: (a) Savings accounts receive 4% interest. (b) Checking accounts with balances of up to $5,000 more than the minimum balance receive 3% interest; otherwise, the interest is 5%. Write a program that reads a customer's account number (int type), account type (char; s for savings, c for checking), minimum balance that the account should maintain, and current balance. The program should then output the account number, account type, current balance, and an appropriate message.

Solution:

```cpp
#include<iostream>
using namespace std;
int main(){
    int account_number,min_balance,current_balance,interest;
    char account_type;

    cout<<"Enter account number: ";
    cin>>account_number;
    cout<<"Enter account type"<<endl;
    cout<<"\'s\' for SAVING ACCOUNT and \'c\' for CHECKING ACCOUNT"<<endl;
    cin>>account_type;
    cout<<"Enter minimum balance to maintain: ";
    cin>>min_balance;
    cout<<"Enter current amount: ";
    cin>>current_balance;

    if (current_balance < min_balance && account_type == 's'){
                    cout<<"\nyour balance is low!!!"<<endl;
                    cout<<"we have deducted 10$"<<endl;

                    cout<<"\n\t Account Number: "<<account_number<<endl;
                    cout<<"\t Account Type: "<<"Saving Account"<<endl;
                    cout<<"\t Current Balance: "<<current_balance<<endl;
                    cout<<"\t Total after deduction: "<< current_balance - 10
<<endl;
    }

    else if(current_balance < min_balance && account_type == 'c'){
                    cout<<"\nyour balance is low!!!"<<endl;
                    cout<<"we have deducted 25$"<<endl;

                    cout<<"\n\t Account Number: "<<account_number<<endl;
                    cout<<"\t Account Type: "<<"Checking Account"<<endl;
                    cout<<"\t Current Balance: "<<current_balance<<endl;
                    cout<<"\t Total after deduction: "<< current_balance -
25<<endl;
```

```cpp
    }

    else if (account_type == 's'){

                    interest = (4.0/100) * current_balance;

                    cout<<"\n\t Account Number: "<<account_number<<endl;
                    cout<<"\t Account Type: "<<" Saving account"<<endl;
                    cout<<"\t Current Balance: "<<current_balance<<endl;
                    cout<<"\t Interest: "<<interest<<endl;
                    cout<<"\t Total: "<< interest + current_balance<<endl;


}
    else if (account_type == 'c'){

                    if( current_balance <= (min_balance + 5000)){
                            interest = (3.0/100) * current_balance;
                                    }
                    else{
                        interest = (5.0/100) * current_balance;
                                    }

                    cout<<"\n\t Account Number: "<<account_number<<endl;
                    cout<<"\t Account Type: "<<" Checking Account"<<endl;
                    cout<<"\t Current Balance: "<<current_balance<<endl;
                    cout<<"\t Interest: "<<interest<<endl;
                    cout<<"\t Total: "<< interest + current_balance<<endl;

}
 cout<<endl;
 system("PAUSE");
 return 0;   }
```

Output:

```
Enter account number: 123
Enter account type
's' for SAVING ACCOUNT and 'c' for CHECKING ACCOUNT
c
Enter minimum balance to maintain: 5000
Enter current amount: 7300

        Account Number: 123
        Account Type:  Checking Account
        Current Balance: 7300
        Interest: 218
        Total: 7518

Press any key to continue . . . |
```

Task 5:

Write a program that calculates and prints the bill for a cellular telephone company. The company offers two types of service: regular and premium. Its rates vary, depending on the type of service. The rates are computed as follows: Regular service: $10.00 plus first 50 minutes are free. Charges for over 50 minutes are $0.20 per minute. Premium service: $25.00 plus: (a) For calls made from 6:00 a.m. to 6:00 p.m., the first 75 minutes are free; charges for more than 75 minutes are $0.10 per minute. (b) For calls made from 6:00 p.m. to 6:00 a.m., the first 100 minutes are free; charges for more than 100 minutes are $0.05 per minute. Your program should prompt the user to enter an account number, a service code (type char), and the number of minutes the service was used. A service code of r or R means regular service; a service code of p or P means premium service. Treat any other character as an error. Your program should output the account number, type of service, number of minutes the telephone service was used, and the amount due from the user. For the premium service, the customer may be using the service during the day and the night. Therefore, to calculate the bill, you must ask the user to input the number of minutes the service was used during the day and the number of minutes the service was used during the night.

Solution:

```cpp
#include<iostream>
#include<string>
using namespace std;
int main(){
    string accountNumber;
    int numberOfMinute;
    int dayMinute,nightMinute;
    float bill,dayMinuteTotal,nightMinuteTotal,subTotal;
    char serviceType;

    cout<<"Enter Account Number: ";
    cin>>accountNumber;
    cout<<"Enter Service Type: "<<endl;
    cout<<" \'r\' for REGULAR and \'p\' for PREMIUM: ";
    cin>>serviceType;


    if (serviceType=='r' || serviceType=='R' ){
                    bill = 10;
                    cout<<"Enter Number of minutes used: ";
                    cin>>numberOfMinute;
                    cout<<endl;
                    cout<<"Your Account Number: "<<accountNumber<<endl;
                    cout<<"Your Service Type: Regular "<<endl;
                    cout<<"Number of Minutes Used: "<<numberOfMinute<<endl;

                    if(numberOfMinute < 50){
                        cout<<"Your Total bill is: "<<bill<<endl;
                        }
                    else{
                        bill = bill + ((numberOfMinute - 50) * 0.20);
                        cout<<"Your Total bill is: "<< bill <<endl;
                        }
            }
```

```cpp
        else if (serviceType == 'p' || serviceType=='P'){
                                bill = 25;
                                cout<<"Enter number of minutes used in day: ";
                                cin>>dayMinute;
                                cout<<"Enter number of minutes used at night: ";
                                cin>>nightMinute;
                                nightMinuteTotal = (nightMinute - 100) * 0.05;
                                dayMinuteTotal = (dayMinute - 75) * 0.10;
                                cout<<endl;
                                cout<<"Your Account Number: "<<accountNumber<<endl;
                                cout<<"Your Service Type: Premium "<<endl;
                                numberOfMinute = dayMinute + nightMinute;
                                cout<<"Number of Minutes Used: "<<numberOfMinute<<endl;
                                if ( (dayMinute < 75) && (nightMinute < 100) ){
                                        cout<<"Your Total bill is: "<< bill<<endl;
                                        }

                                else if ( (dayMinute >= 75) && (nightMinute <= 100) ){
                                        cout<<"Your Total bill is: "<< bill +
dayMinuteTotal<<endl;

                                        }

                                else if ( (dayMinute <= 75) && (nightMinute >= 100) ){
                                        cout<<"Your Total bill is: "<< bill +
nightMinuteTotal<<endl;

                                        }


                                else {
                                        subTotal = nightMinuteTotal + dayMinuteTotal + bill;
                                        cout<<"Your Total bill is: "<< subTotal <<endl;
                                        }
                                }
        else{
                cout<<"Error!!!!!"<<endl;
                cout<<"Wrong Service type"; }
 cout<<endl;
 system("PAUSE");
 return 0; }
```

Output:

```
Enter Account Number: kami_110
Enter Service Type:
 'r' for REGULAR and 'p' for PREMIUM: p
Enter number of minutes used in day: 300
Enter number of minutes used at night: 789

Your Account Number: kami_110
Your Service Type: Premium
Number of Minutes Used: 1089
Your Total bill is: 81.95
```