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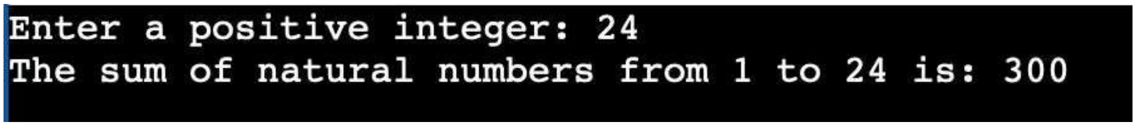
IOT -615-B

Question 1-

CODE-

```
#include <iostream>
using namespace std; int
main() {     int n;

    cout << "Enter a positive integer: ";
cin >> n;

    if (n > 0) {          int totalSum = n * (n + 1) / 2;          cout << "The
sum of natural numbers from 1 to " << n << " is: " <<
totalSum << endl;
    } else {          cout << "Please enter a positive
integer." << endl;
    }
return 0;
}
```

Output-



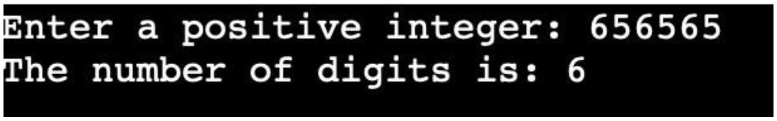
```
Enter a positive integer: 24
The sum of natural numbers from 1 to 24 is: 300
```

Question 2-

CODE-

```
#include <iostream> using
namespace std;  int main()
{
int n;      int count = 0;        cout << "Enter a positive
integer: ";      cin >> n;      if (n <= 0) {            cout <<
"Please enter a positive integer." << endl;         return 0;
   }     while (n !=
0) {         n = n /
10;
count++;
   }
   cout << "The number of digits is: " << count << endl;     return
0;
}
```

Output-



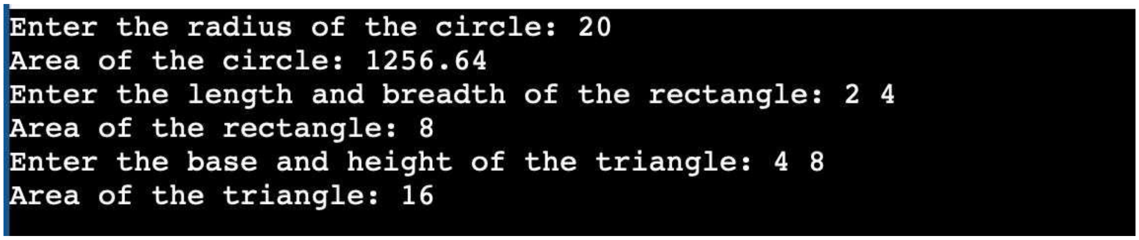
```
Enter a positive integer: 656565
The number of digits is: 6
```

Question 3-

CODE-

```
#include <iostream> #include
<cmath>   using
namespace std;
double
calculateArea(double
radius) {
return M_PI * radius * radius;
}  double calculateArea(double length, double breadth)
{
return length * breadth;
}  double calculateArea(double base, double height, bool isTriangle)
{
return 0.5 * base * height;
}

int main() {
double radius;
   cout << "Enter the radius of the circle: ";
cin >> radius;
   cout << "Area of the circle: " << calculateArea(radius) << endl;

   double length, breadth;      cout << "Enter the length and
breadth of the rectangle: ";
cin >> length >> breadth;
   cout << "Area of the rectangle: " << calculateArea(length, breadth) << endl;

   double base, height;      cout << "Enter the base and
height of the triangle: ";
cin >> base >> height;
   cout << "Area of the triangle: " << calculateArea(base, height, true) << endl;

   return 0;
}
```

Output-



```
Enter the radius of the circle: 20
Area of the circle: 1256.64
Enter the length and breadth of the rectangle: 2 4
Area of the rectangle: 8
Enter the base and height of the triangle: 4 8
Area of the triangle: 16
```

Ouestion 4-

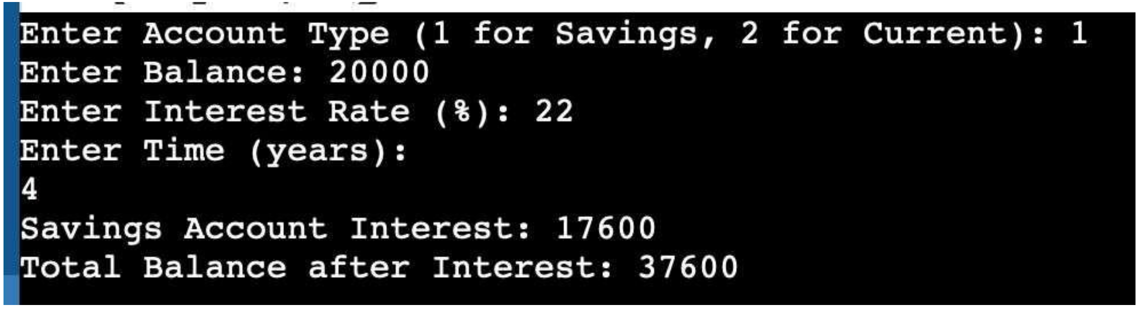
CODE-

```
#include <iostream>  using
namespace std;
```

```
class Account { protected:
   double balance;

public:
   Account(double bal) : balance(bal) {}     virtual
void calculateInterest() = 0;      virtual
~Account() {}
};

class SavingsAccount : public Account {
double rate;      int time;     public:
   SavingsAccount(double bal, double r, int t) : Account(bal), rate(r), time(t) {}

   void calculateInterest() override {          double interest = balance * (rate /
100) * time;         cout << "Savings Account Interest: " << interest << endl;
cout << "Total Balance after Interest: " << (balance + interest) << endl;
   }
};

class CurrentAccount : public Account {
double maintenanceFee;

public:
   CurrentAccount(double bal, double fee) : Account(bal), maintenanceFee(fee) {}

   void calculateInterest() override {
      double finalBalance = balance - maintenanceFee;         cout << "Current
Account Maintenance Fee: " << maintenanceFee << endl;         cout << "Final
Balance after Fee Deduction: " << finalBalance << endl;
   }
};

int main() {     int
accountType;
   cout << "Enter Account Type (1 for Savings, 2 for Current): ";
cin >> accountType;

   if (accountType == 1) {
```

```
double balance, rate;           int
time;           cout << "Enter
Balance: ";
cin >> balance;
    cout << "Enter Interest Rate (%): ";
cin >> rate;
    cout << "Enter Time (years): ";
cin >> time;

    SavingsAccount savings(balance, rate, time);
    savings.calculateInterest();     } else
if (accountType == 2) {          double
balance, maintenanceFee;          cout <<
"Enter Balance: ";          cin
>> balance;          cout << "Enter Monthly
Maintenance Fee: ";
cin >> maintenanceFee;

    CurrentAccount current(balance, maintenanceFee);
current.calculateInterest();
  } else {
    cout << "Invalid account type entered." << endl;
  }

  return 0;
}
```

Output-



```
Enter Account Type (1 for Savings, 2 for Current): 1
Enter Balance: 20000
Enter Interest Rate (%): 22
Enter Time (years):
4
Savings Account Interest: 17600
Total Balance after Interest: 37600
```

Question 5-

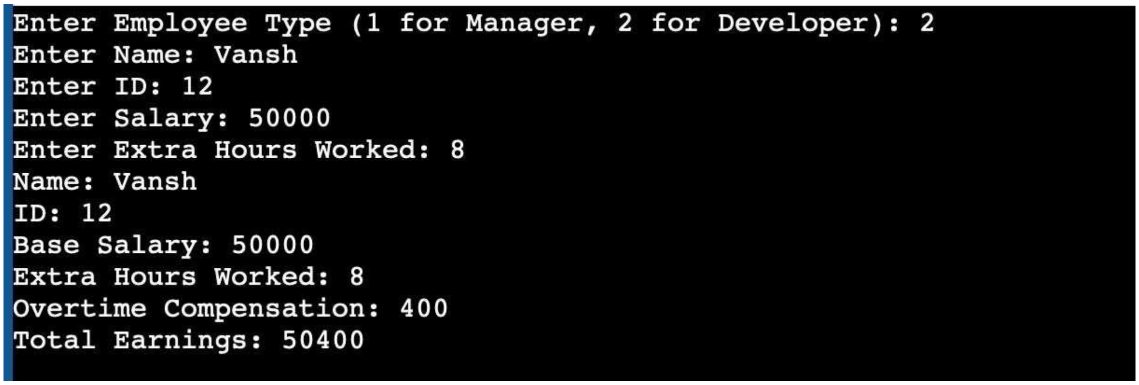
CODE-

```
#include      <iostream>
#include <string> using
namespace std;

class Employee {
protected:
string name;     int
id;     double
salary;

public:
   Employee(string empName, int empId, double empSalary)
      : name(empName), id(empId), salary(empSalary) {}

   virtual void calculateEarnings() = 0;
virtual void displayDetails() {         cout <<
"Name: " << name << endl;         cout
<< "ID: " << id << endl;         cout << "Base
Salary: " << salary << endl;
   }

   virtual ~Employee() {}
};

class Manager : public Employee {
int performanceRating;

public:
   Manager(string empName, int empId, double empSalary, int rating)
      : Employee(empName, empId, empSalary), performanceRating(rating) {}

   void calculateEarnings() override {
double  bonus  =  0;                switch
(performanceRating) {            case 5:
bonus = salary * 0.2; break;            case 4: bonus
= salary * 0.15; break;            case 3: bonus =
salary * 0.1; break;            default:
```

```
bonus = 0; break;
        }
        cout << "Performance Rating: " << performanceRating << endl;
cout << "Bonus: " << bonus << endl;
        cout << "Total Earnings: " << (salary + bonus) << endl;
    }
};

class Developer : public Employee {
int extraHours;

public:
    Developer(string empName, int empId, double empSalary, int hours)
        : Employee(empName, empId, empSalary), extraHours(hours) {}

    void calculateEarnings() override {         double overtimeCompensation =
extraHours * 50;          cout << "Extra Hours Worked: " << extraHours << endl;
cout << "Overtime Compensation: " << overtimeCompensation << endl;         cout
<< "Total Earnings: " << (salary + overtimeCompensation) << endl;
    }
};

int main() {     int employeeType;
    cout << "Enter Employee Type (1 for Manager, 2 for Developer): ";
cin >> employeeType;
    string name;
int id;     double salary;

    cout << "Enter Name: ";
cin >> name;     cout << "Enter
ID: ";     cin >> id;      cout <<
"Enter Salary: ";
cin >> salary;

    if (employeeType == 1) {         int
performanceRating;
        cout << "Enter Performance Rating (1-5): ";         cin
>> performanceRating;
```

```
        Manager manager(name, id, salary, performanceRating);
manager.displayDetails();         manager.calculateEarnings();     } else if
(employeeType == 2) {          int
extraHours;          cout << "Enter Extra
Hours Worked: ";          cin >> extraHours;

        Developer developer(name, id, salary, extraHours);
        developer.displayDetails();
developer.calculateEarnings();
    } else {          cout << "Invalid Employee
Type!" << endl;
    }

    return 0;
}
```

Output-



```
Enter Employee Type (1 for Manager, 2 for Developer): 2
Enter Name: Vansh
Enter ID: 12
Enter Salary: 50000
Enter Extra Hours Worked: 8
Name: Vansh
ID: 12
Base Salary: 50000
Extra Hours Worked: 8
Overtime Compensation: 400
Total Earnings: 50400
```