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SUBJECT NAME: FUNDAMENTALS OF COMPUTING FOR DATA ANALYSIS.

SUBJECT CODE: CSA5779

SLOT NAME: D

EXPERIMENT NO:26

EXPERIMENT NAME: Finding the biggest out of n integers

```c
#include <stdio.h>
int main() {
 int n, i, num, max;
 printf("Enter the value of n: ");
 scanf("%d", &n);
 printf("Enter integer 1: ");
 scanf("%d", &max);
 for (i = 2; i <= n; i++) {
 printf("Enter integer %d: ", i);
 scanf("%d", &num);
 if (num > max) {
 max = num;
 }
 }
 printf("The biggest number is: %d\n", max);
 return 0;
}
```

Output:

```
Enter the value of n: 5
Enter integer 1: 12
Enter integer 2: 13
Enter integer 3: 18
Enter integer 4: 20
Enter integer 5: 25
The biggest number is: 25
```

EXPERIMENT NO:27

EXPERIMENT NAME: Sine series [sin(x) = x - x ^3 /3! + x^ 5 /5! – x^ 7 /7! . . . . .]

```c
#include <stdio.h>
#include <math.h>
int factorial(int n) {
 if (n == 0 || n == 1) {
 return 1;
 } else {
 return n * factorial(n - 1);
 }
}
int main() {
 double x, sum = 0.0;
 int n, sign = 1, i;
 printf("Enter the value of x (in radians): ");
 scanf("%lf", &x);
 printf("Enter the number of terms: ");
 scanf("%d", &n);
 for (i = 1; i <= n; i++) {
 double term = sign * pow(x, (2 * i - 1)) / factorial(2 * i - 1);
 sum += term;
 sign = -sign;
 }
 printf("The value of sin(%lf) using %d terms is: %lf\n", x, n, sum);
 return 0;
}
```

Output:

```
Enter the value of x (in radians): 1.57
Enter the number of terms: 5
The value of sin(1.570000) using 5 terms is: 1.000003
```

EXPERIMENT NO:28

EXPERIMENT NAME: Cos series [cos(x) = 1 – x 2 /2! + x 4 /4! – x 6 /6! . . . . .]

```c
#include <stdio.h>
#include <math.h>
int main() {
 double x, sum = 1.0, term = 1.0;
 int n, sign = -1, fact = 2, i;
 printf("Enter the value of x (in radians): ");
 scanf("%lf", &x);
 printf("Enter the number of terms: ");
 scanf("%d", &n);
 for (i = 1; i <= n; i++) {
 term *= sign * x * x / (fact * (fact - 1));
 sum += term;
 sign = -sign;
 fact += 2;
 }
 printf("The value of cos(%lf) using %d terms is: %lf\n", x, n, sum);
 return 0;
}
```

Output:

```
Enter the value of x (in radians): 0.785
Enter the number of terms: 5
The value of cos(0.785000) using 5 terms is: 0.676394
```

EXPERIMENT NO:29

EXPERIMENT NAME: Exponential series [e -1 = 1 – x/1! + x 2 /2! – x 3 /3! + x4 /4! . . . . .]

```c
#include <stdio.h>
double calculateExponentialSeries(double x, int n) {
 double sum = 1.0, term = 1.0;
 int i, fact = 1;
 for (i = 1; i <= n; i++) {
 term *= (-1) * x / fact;
 sum += term;
 fact++;
 }
 return sum;
}
int main() {
 double x;
 int n;
 printf("Enter the value of x: ");
 scanf("%lf", &x);
 printf("Enter the number of terms: ");
 scanf("%d", &n);
 double result = calculateExponentialSeries(x, n);
 printf("The value of e^(-%lf) using %d terms is: %lf\n", x, n, result);
 return 0;
}
```

Output:

```
Enter the value of x: 1
Enter the number of terms: 5
The value of e^(-1.000000) using 5 terms is: 0.366667
```

EXPERIMENT NO:30

EXPERIMENT NAME: Linear Search

```c
#include <stdio.h>
int linearSearch(int arr[], int n, int key) {
 int i;
 for (i = 0; i < n; i++) {
 if (arr[i] == key) {
 return i;
 }
 }
 return -1;
}
int main() {
 int n, i, key;
 printf("Enter the number of elements: ");
 scanf("%d", &n);
 int arr[n];
 printf("Enter the elements of the array:\n");
 for (i = 0; i < n; i++) {
 scanf("%d", &arr[i]);
 }
 printf("Enter the element to search: ");
 scanf("%d", &key);
 int index = linearSearch(arr, n, key);
 if (index != -1) {
 printf("Element found at index %d\n", index);
 } else {
 printf("Element not found\n");
 }
 return 0;
}
```

Output:

```
Enter the number of elements: 5
Enter the elements of the array:
10 20 30 40 50
Enter the element to search: 30
Element found at index 2
```

```c
#include <stdio.h>
float calculateWaterBill(int usage) {
 float bill = 0.0;
 if (usage <= 1000) {
 bill = 15.0;
 } else if (usage > 1000 && usage <= 2000) {
 int extraUsage = usage - 1000;
 float extraCost = extraUsage * 0.0175;
 bill = 15.0 + extraCost;
 } else if (usage > 2000 && usage <= 3000) {
 int extraUsage = usage - 2000;
 float extraCost = extraUsage * 0.02;
 bill = 15.0 + 0.0175 * 1000 + extraCost;
 } else if (usage > 3000) {
 int extraUsage = usage - 3000;
 float extraCost = extraUsage * 0.02;
 bill = 15.0 + 0.0175 * 1000 + 0.02 * 1000 + extraCost;
 }
 return bill;
}
int main() {
 int usage;
 printf("Enter the cubic feet of water used: ");
 scanf("%d", &usage);
 float bill = calculateWaterBill(usage);
 printf("Water bill: $%.2f\n", bill);
 return 0;
}
```

```
Enter the cubic feet of water used: 2500
Water bill: $42.50
```

```c
#include <stdio.h>
#include <stdlib.h>
int main() {
 int num, sum, checkDigit;
 char cardNumber[6];
 printf("Enter a four-digit number: ");
 scanf("%d", &num);
 sum = (num % 10) + ((num / 10) % 10) + ((num / 100) % 10) + ((num / 1000) % 10);
 if (sum % 2 == 0) {
 checkDigit = 0;
 } else {
 checkDigit = 1;
 }
 sprintf(cardNumber, "%d%d", num, checkDigit);
 printf("Original Number: %d\n", num);
 printf("New Number: %s\n", cardNumber);
 return 0;
}
```

```
Enter a four-digit number: 4737
Original Number: 4737
New Number: 47371
```

```c
#include<stdio.h>
int main() {
 int age;
 float ticketCharge;
 printf("Enter the age of the person: ");
 scanf("%d", &age);
 if (age > 55) {
 ticketCharge = 10.00;
 } else if (age >= 21 && age <= 54) {
 ticketCharge = 15.00;
 } else if (age >= 13 && age <= 20) {
 ticketCharge = 10.00;
 } else if (age >= 3 && age <= 12) {
 ticketCharge = 5.00;
 } else {
 ticketCharge = 0.00;
 }
 printf("Ticket Charge: $%.2f\n", ticketCharge);
 return 0;
}
```

```
Enter the age of the person: 40
Ticket Charge: $15.00
```

```c
#include <stdio.h>
int main() {
 int numPeople;
 int isCompanyBusiness;
 int isOver60;
 int basePrice;
 double discount;
 double totalCost;
 printf("Enter the number of people: ");
 scanf("%d", &numPeople);
 printf("Is the customer staying on company business? (0 for No, 1 for Yes): ");
 scanf("%d", &isCompanyBusiness);
 printf("Is the customer over 60 years of age? (0 for No, 1 for Yes): ");
 scanf("%d", &isOver60);
 if (numPeople == 2)
 basePrice = 85;
 else if (numPeople == 3)
 basePrice = 90;
 else if (numPeople == 4)
 basePrice = 95;
 else
 basePrice = 95 + (6 * (numPeople - 4));
 if (isCompanyBusiness)
 discount = 0.2 * basePrice;
 else if (isOver60)
 discount = 0.15 * basePrice;
 else
 discount = 0;
 totalCost = basePrice - discount;
 printf("Cost of the room: $%.2f\n", totalCost);
 return 0;
}
```

```
Enter the number of people: 4
Is the customer staying on company business? (0 for No, 1 for Yes): 0
Is the customer over 60 years of age? (0 for No, 1 for Yes): 1
Cost of the room: $80.75
```

EXPERIMENT NO:35

```c
#include <stdio.h>
int main() {
 int totalCredits = 0;
 float totalGradePoints = 0;
 int credit;
 char grade;
 printf("Enter the credit and grade for each course (enter 0 for credit to stop):\n")
 while (1) {
 printf("Credit: ");
 scanf("%d", &credit);
 if (credit == 0) {
 break;
 }
 printf("Grade: ");
 scanf(" %c", &grade);
 switch (grade) {
 case 'A':
 totalGradePoints += credit * 4.0;
 break;
 case 'B':
 totalGradePoints += credit * 3.0;
 break;
 case 'C':
 totalGradePoints += credit * 2.0;
 break;
 case 'D':
 totalGradePoints += credit * 1.0;
 break;
 case 'F':
 totalGradePoints += credit * 0.0;
 break;
 default:
 printf("Invalid grade entered.\n");
 continue; }
 totalCredits += credit;}
 if (totalCredits == 0) {
 printf("No courses entered.\n"); }
 else {
 float gpa = totalGradePoints / totalCredits;
 printf("GPA: %.2f\n", gpa);
 }
 return 0;
}
```

```
Enter the credit and grade for each course (enter 0 for credit to stop):
Credit: 4
Grade: A
Credit: 3
Grade: B
Credit: 4
Grade: D 0
Credit: GPA: 2.64
```

EXPERIMENT NO:36

```c
#include <stdio.h>
int main() {
 int numStudents = 200;
 int numAs = 0, numBs = 0, numCs = 0, numDs = 0, numFs = 0;
 printf("Enter the student number and number grade for each student:\n");
 for (int i = 1; i <= numStudents; i++) {
 int studentNumber, numberGrade;
 printf("Student %d\n", i);
 printf("Student Number: ");
 scanf("%d", &studentNumber);
 printf("Number Grade: ");
 scanf("%d", &numberGrade);
 if (numberGrade >= 90 && numberGrade <= 100) {
 numAs++;
 } else if (numberGrade >= 78 && numberGrade <= 89) {
 numBs++;
 } else if (numberGrade >= 65 && numberGrade <= 77) {
 numCs++;
 } else if (numberGrade >= 50 && numberGrade <= 64) {
 numDs++;
 } else if (numberGrade < 50) {
 numFs++;
 }
 }
 printf("Grade Summary:\n");
 printf("A: %d\n", numAs);
 printf("B: %d\n", numBs);
 printf("C: %d\n", numCs);
 printf("D: %d\n", numDs);
 printf("F: %d\n", numFs);
 return 0;
}
```

EXPERIMENT NO:37

```c
#include <stdio.h>
int main() {
 float initialPrice, accessoryPrice, salesTaxRate, totalCost = 0;
 int numAccessories;
 printf("Enter the initial price of the car: ");
 scanf("%f", &initialPrice);
 printf("Enter the number of accessories: ");
 scanf("%d", &numAccessories);
 for (int i = 1; i <= numAccessories; i++) {
 printf("Enter the price of accessory %d: ", i);
 scanf("%f", &accessoryPrice);
 totalCost += accessoryPrice;
 }
 printf("Enter the sales tax rate: ");
 scanf("%f", &salesTaxRate);
 float salesTaxAmount = (salesTaxRate / 100) * (initialPrice + totalCost);
 totalCost = initialPrice + totalCost + salesTaxAmount;
 printf("Total cost of the car: $%.2f\n", totalCost);
 return 0;
}
```

```
Enter the initial price of the car: 2500
Enter the number of accessories: 3
Enter the price of accessory 1: 150
Enter the price of accessory 2: 200
Enter the price of accessory 3: 100
Enter the sales tax rate: 8.5
Total cost of the car: $3200.75
```

EXPERIMENT NO:38

```c
#include <stdio.h>
int main() {
 float originalPrice, salePrice;
 printf("Enter the original price of the item: ");
 scanf("%f", &originalPrice);
 salePrice = originalPrice;
 for (int day = 1; day <= 5; day++) {
 printf("Sale price on day %d: $%.2f\n", day, salePrice);
 salePrice = salePrice - (0.1 * salePrice);
 }
 return 0;
}
```

```
Enter the original price of the item: 20.00
Sale price on day 1: $20.00
Sale price on day 2: $18.00
Sale price on day 3: $16.20
Sale price on day 4: $14.58
Sale price on day 5: $13.12
```

EXPERIMENT NO:39

```c
#include <stdio.h>
int main() {
 float loanAmount = 3000;
 float monthlyPayment = 85;
 float interestRate = 0.01;
 float balance = loanAmount;
 float totalInterest = 0;
 int numYears, numMonths;
 numYears = loanAmount / (12 * monthlyPayment);
 numMonths = loanAmount / (12 * monthlyPayment);
 while (balance > 0) {
 float interest = interestRate * balance;
 float principal = monthlyPayment - interest;
 balance = balance - principal;
 totalInterest = totalInterest + interest;
 printf("Interest: $%.2f, Principal: $%.2f, Balance: $%.2f\n", interest, principal, balance);
 }
 printf("Number of years: %d, Number of months: %d\n", numYears, numMonths);
 printf("Total interest paid: $%.2f\n", totalInterest);
 return 0;
}
```

```
Interest: $17.89, Principal: $67.11, Balance: $1721.84
Interest: $17.22, Principal: $67.78, Balance: $1654.06
Interest: $16.54, Principal: $68.46, Balance: $1585.60
Interest: $15.86, Principal: $69.14, Balance: $1516.46
Interest: $15.16, Principal: $69.84, Balance: $1446.62
Interest: $14.47, Principal: $70.53, Balance: $1376.09
Interest: $13.76, Principal: $71.24, Balance: $1304.85
Interest: $13.05, Principal: $71.95, Balance: $1232.90
Interest: $12.33, Principal: $72.67, Balance: $1160.23
Interest: $11.60, Principal: $73.40, Balance: $1086.83
Interest: $10.87, Principal: $74.13, Balance: $1012.70
Interest: $10.13, Principal: $74.87, Balance: $937.83
Interest: $9.38, Principal: $75.62, Balance: $862.20
Interest: $8.62, Principal: $76.38, Balance: $785.83
Interest: $7.86, Principal: $77.14, Balance: $708.68
Interest: $7.09, Principal: $77.91, Balance: $630.77
Interest: $6.31, Principal: $78.69, Balance: $552.08
Interest: $5.52, Principal: $79.48, Balance: $472.60
Interest: $4.73, Principal: $80.27, Balance: $392.33
Interest: $3.92, Principal: $81.08, Balance: $311.25
Interest: $17.89, Principal: $67.11, Balance: $1721.84
Interest: $17.22, Principal: $67.78, Balance: $1654.06
Interest: $16.54, Principal: $68.46, Balance: $1585.60
Interest: $15.86, Principal: $69.14, Balance: $1516.46
Interest: $15.16, Principal: $69.84, Balance: $1446.62
Interest: $14.47, Principal: $70.53, Balance: $1376.09
Interest: $13.76, Principal: $71.24, Balance: $1304.85
Interest: $13.05, Principal: $71.95, Balance: $1232.90
Interest: $12.33, Principal: $72.67, Balance: $1160.23
Interest: $11.60, Principal: $73.40, Balance: $1086.83
```

EXPERIMENT NO:40

```c
#include <stdio.h>
int main() {
 int totalMiles = 0, totalGallons = 0, odometerReading, previousOdometerReading = 0;
 double averageMPG;
 for (int i = 1; i <= 6; i++) {
 int gallons;
 printf("Fillup %d\n", i);
 printf("Enter gallons of gas: ");
 scanf("%d", &gallons);
 int currentOdometerReading;
 printf("Enter odometer reading: ");
 scanf("%d", &currentOdometerReading);
 int milesDriven = currentOdometerReading - previousOdometerReading;
 totalMiles += milesDriven;
 totalGallons += gallons;
 previousOdometerReading = currentOdometerReading;
 }
 averageMPG = (double) totalMiles / totalGallons;
 printf("\nAverage MPG: %.2f\n", averageMPG);
 return 0;
}
```

```
Fillup 1
Enter gallons of gas: 54
Enter odometer reading: 546
Fillup 2
Enter gallons of gas: 55
Enter odometer reading: 547
Fillup 3
Enter gallons of gas: 59
Enter odometer reading: 642
Fillup 4
Enter gallons of gas: 312
Enter odometer reading: 42
Fillup 5
Enter gallons of gas: 224
Enter odometer reading: 328
Fillup 6
Enter gallons of gas: 633
Enter odometer reading: 63

Average MPG: 0.05
```