Data structure

Experiment :2

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Q.1>design a structure to represent a complex number . get two complex and find sum of them using a function to which structure is passed as a argument .

/\* experiment 2 , question no. 1 \*/

#include <stdio.h>

typedef struct complex

{

float real ;

float img; // img stands for imaginary

}complex;

complex add(complex n1, complex n2);

int main()

{

complex n1,n2,result;

printf("first complex number \n");

printf("enter real and imaginary parts: ");

scanf("%f %f", &n1.real,&n2.img);

printf("\n second complex number \n: ");

printf("enter the real and imaginary part :");

scanf("%f %f",&n1.real,&n2.img);

result = add(n1,n2);

printf("sum=%.1f+%.1f",result.real,result.img);

return 0;

}

complex add(complex n1,complex n2)

{

complex temp;

temp.real=n1.real+n2.real;

temp.img=n1.img+n2.img;

return (temp);

}

Q 2>

/\* experiment 2, ques 2 \*/

#include <stdio.h>

struct student

{

char name[30];

int roll\_number;

struct date\_of\_birth{

int dd;

int mm;

int yy;

}DOB;

};

struct record

{

char name[30];

int roll\_number;

int age;

int sap\_id;

int enrollment\_number;

float marks;

}s;

int main()

{

float subject\_1, subject\_2,subject\_3,subject\_4,subject\_5;

float total,average,percentage;

char grade;

struct student std;

printf("enter information:\n");

printf("enter name:-");

fgets(s.name, sizeof(s.name), stdin);

printf("Enter the roll number:-");

scanf("%d", &s.roll\_number);

printf("enter the age:-");

scanf("%d", &s.age);

printf("enter the date of birth[dd mm yy] format:-");

scanf("%d%d%d",&std.DOB.dd,&std.DOB.mm,&std.DOB.yy);

printf("date of birth : %02d/%02d/%02d\n",std.DOB.dd,std.DOB.mm,std.DOB.yy);

printf("enter the sap id:-");

scanf("%d", &s.sap\_id);

printf("enter the enrollment number:-");

scanf("%d", &s.enrollment\_number);

printf("enter the marks of five subjects::\n");

scanf("%f%f%f%f%f", &subject\_1, &subject\_2, &subject\_3, &subject\_4, &subject\_5);

total = subject\_1 + subject\_2 + subject\_3 + subject\_4 + subject\_5;

average = total / 5.0;

percentage = (total / 500.0) \* 100;

if (average >= 90)

grade = 'A';

else if (average >= 80 && average < 90)

grade = 'B';

else if (average >= 70 && average < 80)

grade = 'C';

else if (average >= 60 && average < 70)

grade = 'D';

else

grade = 'E';

printf("\nthe total marks is: \t%.2f / 500.00\n", total);

printf("\nthe average marks is:\t%.2f\n", average);

printf("\nthe percentage is: \t%.2f%%\n", percentage);

printf("\nthe grade is: \t'%c'\n", grade);

return 0;}

Q.4>

/\* experiment 2, question no. 4 \*/

#include <stdio.h>

#include <string.h>

union product

{

int qnt;

char n[10];

float price;

};

int main()

{

union product t;

int i, n, q;

float m, p;

char a[20];

printf("Enter the number of products purchased: ");

scanf("%d", &n);

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

{

printf("Enter the name of product: ");

scanf("%s", t.n);

strcpy(a, t.n);

printf("Enter the price of the product: ");

scanf("%f", &t.price);

p=t.price;

printf("Enter quantity bought: ");

scanf("%d", &t.qnt);

q=t.qnt;

m=m+p\*q;

printf("\nYou purchased: \n");

printf("\nName: %s, \nQuantity: %d,\n Price: %f\n", a, q, p);

}

printf("\n\nYour total amount is %f",m);

}

Q.3>

/\*experiment 2 question 3 \*/

#include <stdio.h>

#include <math.h>

#include <stdlib.h>

int check=0;

struct equation

{

int a,b,c,root1,root2;

struct equation\* next;

};

int display(struct equation\* en)

{

printf("the quadratic equation is: %dx^2 + %dx + %d",en->a,en->b,en->c);

return 0;

}

int calc\_eqn(struct equation\* en)

{

en->a = 1;

en->b = -(en->root1 + en->root2);

en->c = (en->root1\*en->root2);

return 0;

}

int calc\_root(struct equation\* en1, struct equation\* en2, struct equation\*

sop,int sum)

{

float d;

d= ((en1->root2 + en2->root2)) \* ((en1->root2+en2->root2))-(4 \*(en1->root2\*en2->root2));

if(d>=0)

{

sop->root1 = -((en1->root2 + en2->root2) + sqrt(d))/2;

sop->root2 = -((en1->root2 + en2->root2) - sqrt(d))/2;

}

else

{

check=1;

}

return 0;

}

int main()

{

struct equation equn1, equn2, equn3, sop;

float sum, d;

printf("enter the coffecient of x^2: ");

scanf("%d",&equn3.a);

printf("enter the coffecient of x: ");

scanf("%d",&equn3.b);

printf("enter the constant term: ");

scanf("%d",&equn3.c);

d = ((equn3.b\*equn3.b) - (4\*equn3.a\*equn3.c-sum));

if(d<0)

{

printf("the roots are imaginary and will be complex...");

exit(0);

}

if(d==0)

{

equn3.root1 = -(equn3.b)/2\*equn3.a;

equn3.root2 = -(equn3.b)/2\*equn3.a;

if(equn3.root1<0 ||equn3.root2<0)

{

printf("Roots are negative! ");

exit(0);

}

}

if(d>0)

{

equn3.root1 = (-(equn3.b) - sqrt(d))/(2\*equn3.a);

equn3.root1 = (-(equn3.b) + sqrt(d))/(2\*equn3.a);

if(equn3.root1<0 ||equn3.root2<0)

{

printf("roots are negaive! ");

exit(0);

}

}

printf("\n enter sum of products: ");

scanf("%f", &sum);

equn1.root2=equn3.root1;

equn2.root2=equn3.root2;

calc\_root(&equn1, &equn2, &sop, sum);

if(check==1)

{

printf("solution doesn't exists!");

exit(0);

}

if(sop.root1>0)

{

printf("\n when common root is: %d", sop.root1);

equn1.root1=equn2.root1=sop.root1;

calc\_eqn(&equn1);

calc\_eqn(&equn2);

display(&equn1);

display(&equn2);

}

if(sop.root2>0)

{

printf("\n when common root is: %d", sop.root2);

equn1.root1=equn2.root1=sop.root2;

calc\_eqn(&equn1);

calc\_eqn(&equn2);

display(&equn1);

display(&equn2);

}

return 0;

}