STRUCTURES

19/09/17

```
struct tag-name (optional)
{
    datatype1 member1;
    datatype2 member2;

};
```

e.g

```
struct book
{
    char name[20];          20
    char au-name[30];       30
    int pages;              2
    float price;            4
};                          56      sizeof(book)
```

continuous allocation of memory according to the order of data types ~~declared~~ defined.

```
struct tag_name  var_name
```

e.g

```
struct book b1;
```

```
struct
{
    char name[20];
    char au_name[30];
} b1, b2, b3;
```

→ By default variables of this structure.

```
struct book b1 = {"XYZ", "abc", 100, 120.5}, b2, b3;
```

```
b1.name
b1.au_name
b1.page
b1.price
```

Q. WAP to create a structure date then input date of joining of one employee and print it.

```
struct date
{
    int day;
    int month;
    int year;
};

void main()
{
    struct date doj;
    printf("enter doj");
    scanf("%d %d %d", &doj.day, &doj.month, &doj.year);
    printf("%d %d %d", doj.day, doj.month, doj.year);
    getch();
}
```

Q. WAP to create a structure student to store information like name, roll no. and %age of student, then input information for 2 students and print roll no. of that student whose %age more.

```
struct student
{
  char name[20];
  int roll;
  float per;
};

void main()
{
    struct student s1, s2;
    gets(s1.name);
    gets(s2.name);
    scanf("%d %f", &s1.roll, &s1.per);
    scanf("%d%f", &s2.roll, &s2.per);

    if(s1.per > s2.per)
            printf("%d", s1.roll);
    else
            printf("%d", s2.roll);
    getch();
}
```

Q. Input the values for n no. of students and print name of those students whose percentage is more than 75%.

```
struct student
{
   char name[20];
   int roll;
   float per;
};
void main()
{
      struct student s[50];
      int i, n;
      scanf("%d", &n);
      for(i=0; i<n; i++)
      {
            gets(s[i].name);
            scanf("%d%f", &s[i].roll, &s[i].per);
      }
      for(i=0; i<n; i++)
      {
            if(s[i].per > 75)
                  printf("%f puts(s[i].name);
      }
   getch();
}
```

Q. Create a structure student to store name, roll no. and marks in 5 subjects.
WAP to input information for n no. of students and print %age of all students.

```
struct student
{
   char name[20];
   int roll;
   float mark[5];
};

void main()
{
   struct student s[100];
   float avg;
   int i, j, n, sum = 0;
   scanf("%d", &n);
   for(i=0; i<n; i++)
   {   gets(s[i].name);
       scanf("%d", &s[i].roll);
       for(j=0; j<5; j++)
       {
          scanf("%f", &s[i].mark[j]
       }
   }
   for(i=0; i<n; i++)
   {     sum=0;
      for(j=0; j<5; j++)
      {
          sum += s[i].mark[j];
      }
   avg = sum/5;
   printf("%f", avg);
   getch(); }
```

Q. Create a structure employee to store information like name, Date of Joining and salary.
WAP to input information for n no. of employees and print total salary distributed in a month.

(1)

```
struct employee
{
    char name[30];
    int day;
    int month;
    int year;
    float salary;
};

void main()
{
    struct employee e[50];
    int i, n
    scanf("%d", &n);
    for(i=0; i<n; i++)
    {
        gets(e[i].name)
```

(2)

```
struct date
{
    int day;
    int month;
    int year;
};
struct employee
{
    char name[20];
    struct date doj;
    int salary;
}
```

(3)

```
struct employee
{
    char name[20];
    struct date
    {
        int day;
        int month;
        int year;
    }doj;
    int salary;
};
```

```
void main
{
    struct employee e[50];
    int i, sum=0, n,
    scanf("%d", &n);
    for(i=0; i<n; i++)
    {
        gets(e[i].name)
        scanf("%d%d%d",
            &e[i].doj.day,
            &e[i].doj.month,
            &e[i].doj.year);
```

```
    scanf("%d", e[i].salary);
}

for(i=0; i<n; i++)
{
    sum += e[i].salary;
}
printf("%d", sum);
getch();
}
```

UNION

```
union tmp
{
  int x;
  float y;
  char z;
};
```

⟶ size of union = highest memory occupying member

BIT FIELD

decide the length of the variable ; user

```
struct tmp
{
  int day : 1;
}
```

⟶ applied only on integer data type

total sum of assigned bit field can not be more than size of integer variable.

=> accessing member :

```
scanf("%d", temp);
c.day = temp;
```

FILE HANDLING

- permanent storage

text files (.txt) and binary files can be accessed through C programming.

```
FILE *fp;
fp = fopen("file name", "mode");
```

pre defined structure

- r → read
- w → write
- a → append

char_var: getc - get a single character from the file.
putc - to write character into the file.

int_var: getw - get no. from the file.
putw - to put no. into the file.

```
getc(fp);
putc(data, fp);
```

EOF - End of file

ctrl + Z - save file

```
fclose(fp);
```

Q. WAP to input characters in a file, the read the characters from the file and count how many of them are vowels.

```
void main()
{
    int c=0;
    FILE *fp; char ch;
    printf("enter characters");
    fp = fopen("charc.txt","w");
    while((ch = getchar()) != EOF)
    {
        putc(ch, fp);
    }
    fclose(fp);
    fp = fopen("charc.txt", "r");
    while(ch= getc(fp)) != EOF)
    {
        ch = toupper(ch);
        if(ch=='A'|| ch=='E'|| ch=='I'|| ch=='O'|| ch=='U')
            c++;
    } fclose(fp);
    printf("%d", c);
    getch();
}
```

Q. WAP to input characters, ~~convert~~ ~~int~~ in lowercase in a file and then read the characters from the file display in uppercase.

```
void main()
{
    char ch;
```

```
FILE * fp
printf ("enter characters");
fp = fopen ("file.txt", "w");
while (ch = getchar()) != EOF)
{
    putc(ch,fp);
}
fclose (fp);
fp = fopen ("file.txt", "r");
while (ch = getc(fp)) != EOF)
{
    printf ("%c", ch - 32);
}
fclose (fp);
getch();
}
```

Q. WAP to input no. in a file and then count how many of them are even no..

```
void main()
{
FILE *fp;
int c = 0, n, num, i;

fp = fopen ("test.txt", "w");
printf ("Enter limit");
scanf ("%d", &n)
for (i = 0; i<n; i++)
{
    scanf ("%d", &num);
    putw (num, fp);
}
```

```
fclose(fp);
fp = fopen("test.txt", "r");
for(i=0; i<n; i++)
{
    num = getw(fp);
    if(num%2==0)
        c++;
}
fclose(fp)
printf("%d", c);
}
```

Q. WAP to input no. in a file and copy those no. into two files on the basis of +ve & -ve no.

```
void main()
{FILE *fp,*f1,*f2;
 int n, num, i;
 fp = fopen("test".txt","w");
 printf("Enter limit);
 scanf("%d", &n);
 for(i=0; i<n; i++)
 {
    scanf("%d", &num);
    putw(num, fp);
 }
 fclose(fp);
 fp = fopen("test.txt","r");
 f1 = fopen("positive.txt","w");
 f2 = fopen("negative.txt","w");
 for(i=0; i<n; i++)
 {
```

```
        num = getw(fp)
        if (num > 0)
            putw(num, f1);
        else
            putw(num, f2);
    }
    fclose(fp);
    fclose(f1);
    fclose(f2);
    fp = fopen("test.txt", "r");
    for (i=0; i<n; i++)
    {
        getw(num, fp)
        printf("%d", num);
    }
    fclose(fp);
    f1 = fopen("positive.txt", "r");
    for (i=0; i<n; i++)        while (num = getw(f1) != EOF)
    {
        getw(num, f1);
        printf("%d", num);
    }
    fclose(f1);
    f2 = fopen("negative.txt", "r");
    for (i=0; i<n; i++)        while (num = getw(f2) != EOF)
    {
        getw(num, f2);
        printf("%d", num);
    }
    fclose(f2);
    getch();
}
```

take a counter in both cond^n to use for loop instead.

rewind(fp);

into

03/05/17

Q. WAP to input +ve integers in a file, then calculate factorial of all no. using function fact() and save the calculated factorial into another file.

```
int fact (int);
void main ()
{
   FILE *fp,*fc;
   int n, num, i, f;
   fp = fopen ("factorial.txt", "w");
   printf ("enter limit");
   scanf ("%d", &n);
   for (i=0; i<n; i++)
   {
      scanf ("%d", &num);
      putw (num, fp);
   }
   fclose (fp);
fp=fopen ("factorial.txt", "r");
fc=fopen ("f.txt", "w");
   for (i=0; i<n; i++)
   {
      num = getw (fp);
      f=fact (num);
      printf ("%d", f);   putw (f, fc);
   }
   fclose (fp);
   fclose (fc);
int fact (int num)
{
      int f=1, i
      for (i = 2; i<=num; i++)
         f = f* i;
      return (f);
```