Array using function

```
#include<stdio.h>
void rd(float a[],int n)
{  int i;
   for (i=1;i<=n;i++) scanf("%f",&a[i]);
}
float sum(float a[],int n)
{  int i;float s=0;
   for (i=1;i<=n;i++) s=s+a[i];
   return s;
}
main()
{  int size;float x[20],g;
   printf("Give size");scanf("%d",&size);
   rd(x,size); g=sum(x,size); printf("%f",g);
}
```

The above program reads n numbers, stores them in array and finds sum.

1. Define function float ab(float x[],int n). It returns $x_1*x_2 + x_2*x_3 + x_3*x_4+ \ldots.. x_{n-1}*x_n$ If n=7 and $x_1, x_2, \ldots, x_n$ are 4,5,2,5,6,4,7 then output is 4*5+5*2+2*5+5*6+6*4+4*7=122.

2. Define function float ac(float x[], int n, int k). It returns $x_1*k + x_2*(k+1) + x_3*(k+2) +...+ x_n*(n+k-1)$ for above input and k=5 answer is 275.

3. Define function float ad(float x[], int n, int k). It returns $x_1+x_2*k+x_{3*}k^2+...+ x_n*k^{n-1}$. for above input and k=10 answer is 7465254. For k=3 the answer is 6733.

4. Define function float ae(float x[], int n, int k). It returns $x_n+x_{n-1}*k+x_{n-2*}k^2+...+ x_1*k^{n-1}$. for above input and k=10 answer is 4525647. For k=3 the answer is 4501.

```
#include<stdio.h>
void rd(float a[],int n)
{  int i;
   for (i=1;i<=n;i++) scanf("%f",&a[i]);
}
void wr(float a[],int n)
{  int i;
   for (i=1;i<=n;i++) printf("%5.1f",a[i]);
   printf("\n");
}
void add(float a[],float b[],int n,float c[])
{  int i;
   for (i=1;i<=n;i++) c[i]=a[i]+b[i];
}
main()
{  int size;float x[20],y[20],z[20],g;
   printf("Give size");scanf("%d",&size);
   rd(x,size); rd(y,size);
   add(x,y,size,z); wr(z,size);
}
```

The above program reads two arrays and finds sum of corresponding elements.

5. Define function void increment(float x[], float y[], int n). Here array x and n are input. Output is array y. Here every element is 1 more than that of array x. For above input array y will become 5,6,3,6,7,5,8.

6. Define function void shl(float x[], float y[], int n). It performs shift left. For above input array y will become 5,2,5,6,4,7,0.

7. Write similar function for shift right (shr). For above input array y is 0,4,5,2,5,6,4.

8. Write similar function for rotate left (rol). For above input array y is 5,2,5,6,4,7,4.

9. Define function float rcl(float x[], float y[], int n, int cy). It performs rotate left with carry (cy). For above input and cy=3 the array y is 5,2,5,6,4,7,3. The value returned is 4.

10. Define similar functions for ror, rcr.

11. Define function void da(int y, int n, float x[]). y and n are input. It decomposes given number into digits. If y=42456 and n=7 then array x will become 6,5,4,2,4,0,0.
12. Define db which is similar to above. However array x becomes 0,0,4,2,4,5,6.
13. Define function int dc(int y, float x[]). Here y is input. It decomposes given number into digits and returns the number of digits. If y=42416 then array x will become 6,1,4,2,4 and 5 will be returned. If y=279 then array x will become 9,7,2 and 3 will be returned.
14. Define function float ba(float x[], float y[], int n). It returns $x_1*y_1+x_2*y_2+ ...+ x_n*y_n$. Let n=4 and array x is 5,7,2,4 and array y is 8,2,5,3 then output is 5*8+7*2+2*5+4*3=76.
15. Define followings: [Do not use nested loop. In (ii) and (iii) use sum function]

(i) $(x_1 * y_n) + (x_2 * y_{n-1}) + (x_3 * y_{n-2}) + \ldots + (x_n * y_1)$

(ii) $x_1*(y_1+y_2+y_3+\ldots+y_n) + x_2*(y_1+y_2+ \ldots+y_{n-1}) + x_3*(y_1+y_2+\ldots+y_{n-2}) +\ldots+ x_{n-1}*(y_1+y_2) + x_n*y_1$

(iii) $x_1*(y_1+y_2+\ldots+y_n) + (x_1+x_2)*(y_1+\ldots+y_{n-1}) + (x_1+x_2+x_3)*(y_1+\ldots+y_{n-2}) +\ldots+ (x_1+x_2+\ldots+x_n)*y_1$

   Let n=4 and array x is 5,7,2,4 and array y is 8,2,5,3 then outputs are 86, 247 and 554 respectively.

Some Examples on function

1. Generate and get the following values:

$$f(1)=1+\frac{1}{1} \quad f(2)=1+\cfrac{1}{1+\cfrac{1}{2}} \quad f(3)=1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3}}} \quad f(4)=1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4}}}} \quad \begin{array}{l} f(7)=1.616 \\ f(4)=1.643 \end{array}$$

2. Modify the above program considering function *fun1()* which takes the value *n* and returns *fun1(n)*.
3. Generate and get the following values:

$$f(1)=1+\frac{1}{1} \quad f(2)=1+\cfrac{2}{1+\cfrac{1}{2}} \quad f(3)=1+\cfrac{3}{1+\cfrac{2}{1+\cfrac{1}{3}}} \quad f(4)=1+\cfrac{4}{1+\cfrac{3}{1+\cfrac{2}{1+\cfrac{1}{4}}}} \quad \begin{array}{l} f(7)=3.182 \\ f(20)=5.055 \end{array}$$

4. Modify the above program considering function *fun2()* which takes the value *n* and returns *fun2(n)*.
5. Generate and get the following values:

$$f(1)=1+\frac{1}{2} \quad f(2)=1+\cfrac{4}{1+\cfrac{1}{4}} \quad f(3)=1+\cfrac{6}{1+\cfrac{4}{1+\cfrac{1}{6}}} \quad f(4)=1+\cfrac{8}{1+\cfrac{6}{1+\cfrac{4}{1+\cfrac{1}{8}}}} \quad \begin{array}{l} f(4)=4.45 \\ f(20)=6.98 \end{array}$$

6. Modify the above program considering function *fun3()* which takes the value *n* and returns *fun3(n)*.

```c
//Q1
#include<stdio.h>

main()
{
int i, j, n;
float f[20];
printf("Enter n: ");
scanf("%d", &n);
for (i=0; i<n; i++)
{
f[1]=(1+(1/float(n)));
j=1;
   do
   {
   f[j+1]=1+1/f[j]; j++;
   } while (j<n);
}
printf("\n f[%d]=%f",n,f[j]);
}
```

```c
//Q2
#include<stdio.h>
void fun1(int);
main()
{
int n;
printf("Enter n: ");
scanf("%d", &n);
fun1(n);
}
void fun1 (int n)
{
int i, j;
float f[20];
for (i=0; i<n; i++)
{
f[1]=(1+(1/float(n)));
j=1;
   do
   {
   f[j+1]=1+1/f[j]; j++;
   } while (j<n);
}
printf("\n f[%d]=%f",n,f[j]);

}
```

```c
//Q3
#include<stdio.h>

main()
{
int i, j, n;
float f[30];
printf("Enter n: ");
scanf("%d", &n);
for (i=0; i<n; i++)
{
f[1]=(1+(1/float(n)));
j=1;
   do
   {
   f[j+1]=1+(j+1)/f[j]; j++;
   } while (j<n);
}
if (n==1) printf("\n f[%d]=%f",n,f[1]);
else
printf("\n f[%d]=%f",n,f[j]);
}
```

```c
//Q4
#include<stdio.h>
void fun2(int);
main()
{
int n;
printf("Enter n: ");
scanf("%d", &n);
fun2(n);
}
void fun2 (int n)
{
int i, j;
float f[30];
for (i=0; i<n; i++)
{
f[1]=(1+(1/float(n)));
j=1;
   do
   {
   f[j+1]=1+(j+1)/f[j]; j++;
   } while (j<n);
}
if (n==1) printf("\n f[%d]=%f",n,f[1]);
else
printf("\n f[%d]=%f",n,f[j]);
}
```

```c
//Q5

#include<stdio.h>

main()
{
int i, j, n;
float f[30];
printf("Enter n: ");
scanf("%d", &n);
for (i=0; i<n; i++)
{
f[1]=(1+(1/float(2*n)));
j=1;
   do
   {
   f[j+1]=1+((2*(j+1))/f[j]); j++;
   } while (j<n);
}
if (n==1) printf("\n f[%d]=%f",n,f[1]);
else
printf("\n f[%d]=%f",n,f[j]);
}
```

```c
//Q6

#include<stdio.h>
void fun3(int);
main()
{
int n;
printf("Enter n: ");
scanf("%d", &n);
fun3(n);
}
void fun3 (int n)
{
int i, j;
float f[30];
for (i=0; i<n; i++)
{
f[1]=(1+(1/float(2*n)));
j=1;
   do
   {
   f[j+1]=1+((2*(j+1))/f[j]); j++;
   } while (j<n);
}
if (n==1) printf("\n f[%d]=%f",n,f[1]);
else
printf("\n f[%d]=%f",n,f[j]);
}
```