```
#include <stdio.h>
#include <math.h>
int a=0,b=0,c=0,a1=0,b1=0,com[5]={1,0,0,0,0};
int anum[5]={0},anumcp[5] ={0},bnum[5]={0};
int acomp[5]={0},bcomp[5]={0},pro[5]={0},res[5]={0};
void binary(){
a1 = fabs(a);
b1 = fabs(b);
int r, r2, i, temp;
for(i = 0; i < 5; i++){
r = a1 % 2;
a1 = a1 / 2;
r2 = b1 % 2;
b1 = b1 / 2;
anum[i] = r;
anumcp[i] = r;
bnum[i] = r2;
if(r2 == 0){
bcomp[i] = 1;
}
if(r == 0){
acomp[i] =1;
}
}
c = 0;
for( i = 0; i < 5; i++){
res[i] = com[i]+ bcomp[i] + c;
if(res[i]>=2){
c = 1;
}
else
```

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c = 0;
res[i] = res[i]%2;
}
for(i = 4; i>= 0; i--){
bcomp[i] = res[i];}
if(a<0){
c = 0;
for(i = 4; i>= 0; i--){
res[i] =0;
}
for( i = 0; i < 5; i++){
res[i] = com[i]+ acomp[i] + c;
if(res[i]>=2){
c = 1;
}
else
c = 0;
res[i] = res[i]%2;
}
for(i = 4; i>= 0; i--){
anum[i] = res[i];
anumcp[i] = res[i];
}
}
if(b<0){
for(i=0;i<5;i++){
temp = bnum[i];
bnum[i] = bcomp[i];
bcomp[i] = temp;
}
}
```

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}
void add(int num[]){
int i;
c = 0;
for( i = 0; i < 5; i++){
res[i] = pro[i]+ num[i] + c;
if(res[i]>=2){
c = 1;
}
else
c = 0;
res[i] = res[i]%2;
}
for(i = 4; i>= 0; i--){
pro[i] = res[i];
printf("%d",pro[i]);
}
printf(":");
for(i = 4; i>= 0; i--){
printf("%d",anumcp[i]);
}
}
void arshift(){
int temp = pro[4], temp2 = pro[0],i;
for(i = 1; i <5  ; i++){
pro[i-1] = pro[i];
}
pro[4] = temp;
for(i = 1; i < 5  ; i++){
anumcp[i-1] = anumcp[i];
}
```

```
anumcp[4] = temp2;
printf("\nAR-SHIFT: ");
for(i = 4; i>= 0; i--){
printf("%d",pro[i]);
}
printf(":");
for(i = 4; i>= 0; i--){
printf("%d",anumcp[i]);
}
}void main(){
int i, q=0;
printf("\t\tBOOTH'S MULTIPLICATION ALGORITHM");
printf("\nEnter two numbers to multiply: ");
printf("\nBoth must be less than 16");
do{
printf("\nEnter A: ");
scanf("%d",&a);
printf("Enter B: ");
scanf("%d",&b);
}while(a>=16 || b>=16);
printf("\nExpected product = %d", a*b);
binary();
printf("\n\nBinary Equivalents are: ");
printf("\nA = ");
for(i = 4; i>= 0; i--){
printf("%d",anum[i]);
}
printf("\nB = ");
for(i = 4; i>= 0; i--){
printf("%d",bnum[i]);
}
```

```
printf("\nB'+ 1 = ");
for(i = 4; i>= 0; i--){
printf("%d",bcomp[i]);
}
printf("\n\n");
for(i=0;i<5;i++){
if(anum[i] == q){
printf("\n-->");
arshift();
q = anum[i];
}
else if(anum[i] == 1 && q == 0){
printf("\n-->");
printf("\nSUB B: ");
add(bcomp);
arshift();
q = anum[i];
}
else{
printf("\n-->");
printf("\nADD B: ");
add(bnum);
arshift();
q = anum[i];
}
}
printf("\nProduct is = ");
for(i = 4; i>= 0; i--){
printf("%d",pro[i]);
}
for(i = 4; i>= 0; i--){
```

```
printf("%d",anumcp[i]);
}
}
```