Problem statement:

Write a program to add two numbers without using '+' operator.

```
x = 3, y = 4

Algorithm:

Step 1: x++; y--;

Step 2: repeat step 1 until y becomes 0
```

1. x = 4, y = 3

2. x = 5, y = 2

3. x = 6, y = 1

4. x = 7, y = 0 stop

Management

Projects   Symbols

Workspace

Start here   addWoPlus.c

```c
//Program to add two numbers without a plus operator
#include <stdio.h>
int main()
{
    int x, y;
    printf("Enter the two numbers you want to add: ");
    scanf("%d %d", &x, &y);

    while(y != 0)
    {
        x++;
        y--;
    }
    printf("Sum of two values is %d", x);
    return 0;
}
```

Logs & others

Code::Blocks   Search results   Cccc   Build log   Build messages   CppCheck   CppCheck messages   Cscope

File   Edit   View   Search   Project   Build   Debug   Fortran   wxSmith   Tools   Tools+   Plugins   DoxyBlocks   Settings   Help

`<global>`   main() : int

Management
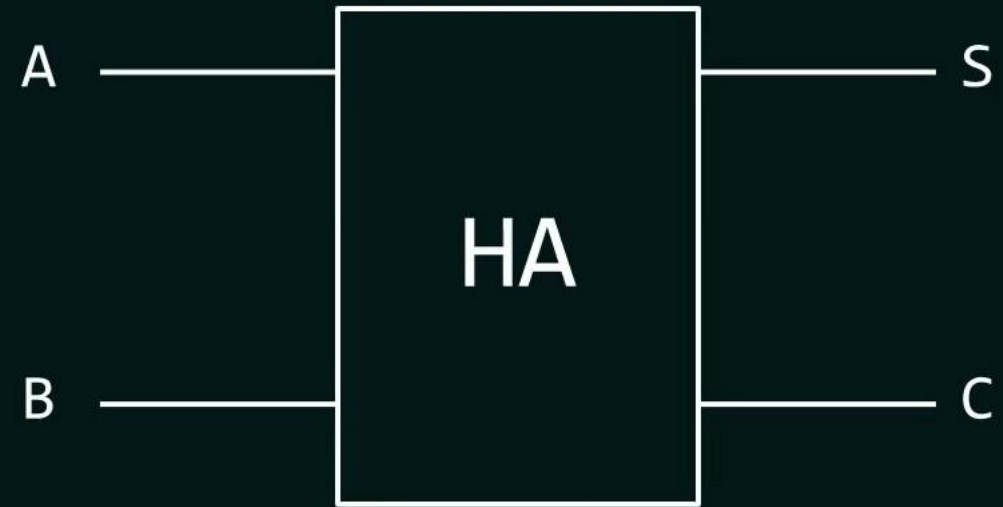
Projects   Symbols

Workspace

Start here   addWoPlus.c

```c
1   //Program to add two numbers without a plus operator
2   #include <stdio.h>
3   int main()
4   {
5       int x, y;
6       printf("Enter the two numbers you want to add: ");
7       scanf("%d %d", &x, &y);
8
9       if(y > 0)
10      {
11          while(y != 0)
12          {
13          x++;
14          y--;
15          }
16      }
17      else if(y < 0)
18      {
19          while(y!=0)
20          {
21              x--;
22              y++;
23          }
24      }
25      printf("Sum of two values is %d", x);
26      return 0;
27  }
```

Half Adder basics

A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

A ———— HA ———— S

B ———— HA ———— C

S = A xor B

C = A AND B

IMPLEMENTATION

```
while(b != 0)
{
    sum = a^b;
    carry = (a&b)<<1;
    a = sum;
    b = carry;
}
```

```
              11
5 ->  0101      7 ->  0111
10 -> 1010      2 ->  0010
_____         _____
15 <- 1111      9 <-  1001


Sum   1111    Iteration 1:
Carry 0000    Sum   0101
              Carry 0010 -> 0100

              Iteration 2:
              Sum   0001
              Carry 0100 -> 1000

              Iteration 3:
              Sum   1001
              Carry 0000    STOP
```

```
while(b != 0)
{
    sum = a^b;
    carry = (a&b)<<1;
    a = sum;
    b = carry;
}
```

```
             111
     7 ->   0111
     7 ->   0111
    _____
    14 <-  1110

Iteration 1:
Sum    0000
Carry 0111 -> 1110

Iteration 2:
Sum    1110
Carry 0000    STOP
```

Management

Projects Symbols

Workspace

Start here | addWoPlus.c | **addTwoWoPlus.c**

```c
1   //Program to add two numbers without using the plus operator using half adder
2
3   #include <stdio.h>
4
5   int main()
6   {
7       int sum, carry, a, b;
8       printf("Enter the two numbers: ");
9       scanf("%d %d", &a, &b);
10
11      while(b != 0)
12      {
13          sum = a^b;
14          carry = (a&b)<<1;
15          a = sum;
16          b = carry;
17      }
18      printf("Sum of two numbers is: %d", sum);
19      return 0;
20  }
21
```