In this lab, we will write 4 functions that manipulate individual bits in a register. To test your code, use the code available at http://www.cs.pitt.edu/~sab104/teaching/cs447/labs/testCodeLab7.asm.

1) Set bits in a range

Write a function that sets the bits (makes them 1) of a number in a range.

Function definition: int setbits(int src, int start, int end)

Parameters:
- src: the number that will be modified
- start: start position (including) of range
- end: end position (including) of range

Return value:
- The number with the specified bits set

Registers contain 32 bits. Bit positions are from 0 to 31. So, if you are asked to set bits from index 3 to index 10, you have to make those 8 bits 1.

Example:

src: 0000 0000 0000 0000 1011 0011 0011 0110b
start: 3
end: 10

Return value: 0000 0000 0000 0000 1011 0111 1111 1110

2) Clear bits in a range

Write a function that clears the bits (makes them 0) of a number in a range.
Function definition: int clearbits(int src, int start, int end)

Parameters:
src: the number that will be modified
start: start position (including) of range
end: end position (including) of range

Return value:
The number with the specified bits cleared

If you are asked to clear bits from index 3 to index 10, you have to make those 8 bits 0.

Example:

src: 0000 0000 0000 0000 1011 0011 0001 110b
start: 3
end: 10

Return value: 0000 0000 0000 0000 1011 0000 0000 110

3) Copy bits in a range

Write a function that copies the bits of a number in a range into another number (the return value).

Function definition: int copybits(int src, int start, int end)

Parameters:
src: the source from where to copy the bits
start: start position (including) of range
end: end position (including) of range

Return value:
The number with the specified bits copied

If you are asked to copy bits from index 3 to index 10, you extract those 8 bits from src and put them at the beginning of the return value.

Example:

src: 0000 0000 0000 0000 1011 0011 0000 0110b
start: 3
end: 10

Return value: 0000 0000 0000 0000 0000 0000 0110 0110
4) Insert bits in a range

Write a function that copies the bits of a number in a range into another number without modifying the other values of the destination.

Function definition: int insertbits(int src, int dest, int start, int end)

Parameters:
src: the source from where to copy the bits
dest: the destination where the bits will be copied
start: start position (including) of range
end: end position (including) of range

Return value:
The dest with the specified bits copied, all other bits unchanged

If you are asked to insert bits into dest from index 3 to index 10 (8 bits), you extract the first 8 bits of src and put them in dest from index 3 to index 10 without modifying the other bits of dest.

Example:

src: 1010 1010 1010 1010 1010 1010 1010 1010b
dest: 0000 0000 1001 0010 0101 0 101 0101 011b
start: 3
end: 10

Return value: 0000 0000 1001 0010 0101 0101 0101 011b