Implicit List: Finding a Free Block

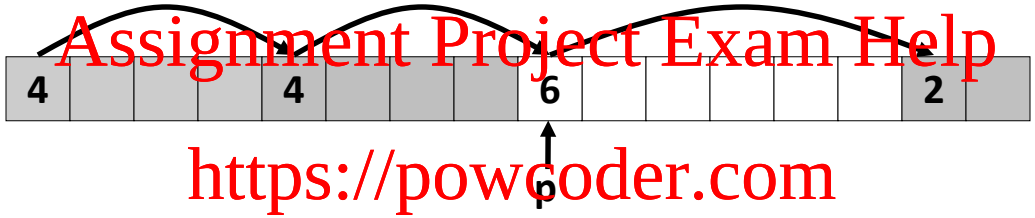
- ***First fit:***
  - Search list from beginning, choose ***first*** free block that fits:

```
p = start;
while ((p < end) &&      \\ not passed end
       ((*p & 1) ||      \\ already allocated
       (*p <= len));     \\ too small
  p = p + (*p & -2);     \\ goto next block (word addressed)
```

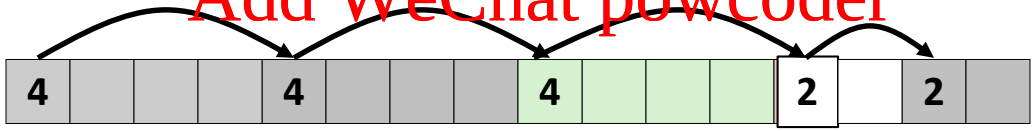

  - Can take linear time in total number of blocks (allocated and free)
  - In practice it can cause "splinters" at beginning of list
- ***Next fit:***
  - Like first fit, but search list starting where previous search finished
  - Should often be faster than first fit: avoids re-scanning unhelpful blocks
  - Some research suggests that fragmentation is worse
- ***Best fit:***
  - Search the list, choose the ***best*** free block: fits, with fewest bytes left over
  - Keeps fragments small—usually helps fragmentation
  - Will typically run slower than first fit

Implicit List: Allocating in Free Block

- **Allocating in a free block: *splitting***
  - Since allocated space might be smaller than free space, we might want to split the block



`addblock(p, 4)`




```
void addblock(ptr p, int len) {
  int newsize = len;
  int oldsize = *p & -2;                  // mask out low bit
  *p = newsize | 1;                       // set new length
  if (newsize < oldsize)
    *(p+newsize) = oldsize - newsize;     // set length in remaining
}                                         //   part of block
```