Assume, for all of the questions in this part, that filesystem blocks are 4 KBytes.

Q1. Consider a really simple filesystem, **cs302fs**, where each inode only has 10 direct pointers, each of which can point to a single file block. Direct pointers are 32 bits in size (4 bytes). What is the maximum file size for **cs302fs**?

40KBytes

There are only 10 direct pointers and the block size for each block is 4 KBytes, so the maximum file size for cs302fs is 10*4KBytes = 40KBytes.

Q2. Consider a filesystem, called **extcs302fs**, with a construct called an extent. Extents have a pointer (base address) and a length (in blocks). Assume the length field is 8 bits (1 byte). Assuming that an inode has exactly one extent. What is the maximum file size for **extcs302fs**?

1020KBytes

Since the length field is 8 bits, it can hold at most 2^8 -1 = 255 blocks. Because the block size for each block is 4 KBytes, the the maximum file size for extcs302fs is 255*4KBytes = 1020KBytes.

Q3. Consider a filesystem that uses direct pointers, but also adds indirect pointers and double-indirect pointers. We call this filesystem, indcs302fs. Specifically, an inode within indcs302fs has 1 direct pointer, 1 indirect pointer, and 1 doubly-indirect pointer field. Pointers, as before, are 4 bytes (32 bits) in size. What is the maximum file size for indcs302fs?

4KBytes+4MBytes+4GBytes.

For a direct pointer, it can point to a block with size 4KBytes.

For an indirect pointer, it firstly points to a block which can hold 4KBytes/4Bytes=1K direct pointers. So it can obtain 1K*40KBytes = 40MBytes.

For a doubly-indirect pointer, it firstly points to a block which can hold 4KBytes/4Bytes=1K indirect pointers, and which can hold 1K*1K=1M direct pointers. So it can obtain 1M*40KBytes = 40GBytes.

Therefore, the the maximum file size for indcs302fs is 1*4KBytes+1*4MBytes+1*4GBytes =4KBytes+4MBytes+4GBytes.