A SIMPLE C PROGRAM

5:00 / 5:00 1.0x

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1. CHECK YOUR UNDERSTANDING (1 point possible)

How would the C preprocessor handle the line `#define MAX 100` within a C program?

- After the compiler generates the machine code, the binary value `100` would be substituted for all instances of the string `"MAX."`
- All instances of the string `"MAX"` would be replaced with the string `"100"` before the program was compiled. ✔
- The integer `"MAX"` would be replaced with the decimal value `"100"` before the program was compiled.
- The integer `"MAX"` would be replaced with the binary value `"100"` before the program was compiled. ✖

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EXPLANATION

Because the preprocessor is working with the source program, which is a text file, it is only concerned with replacing text with text when performing macro substitution. Therefore, in this case, it will replace all instances of the text string `"MAX"` with the string `"100."`

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2. CHECK YOUR UNDERSTANDING (1/1 point)

Consider the following C variable declarations:

```
int number;

char character;
```

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How much space would be needed for each of these variables when compiling the program for the LC-3 ISA?

- 8 bits for `number` and 8 bits for `character`.
- 8 bits for `number` and 8 bits for `character`.
- 16 bits for `number` and 8 bits for `character`.
- 16 bits for `number` and 16 bits for `character`. ✔

EXPLANATION

In C, an integer is the natural word size, which is 16 bits for the LC-3. A character is at least 8 bits, but in LC-3, the smallest data size is 16 bits. So both an integer and a character are represented using 16 bits.

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3. CHECK YOUR UNDERSTANDING (1/1 point)

How would the compiler represent the C literal '0' when compiling code for the LC-3 ISA?

- As an 8 bit ASCII value.
- As a 16 bit ASCII value. ✔
- As an 8 bit two's complement number.
- As a 16 bit two's complement number.

EXPLANATION

Because the smallest data size is 16 bits in the LC-3, the data will be 16 bits in length. The single quotes indicate that "0" is to be represented as a character, so the compiler will create a 16 bit ASCII code for "0" (0030 in hex or 0000000000110000 in binary).

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