

MEE 333 Winter Break Homework

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Exercises:

1. Helloworld.c file attached.
2. A pointer is variable that stores the address of another variable. When a non-pointer variable is initialized the memory is allocated based on the data type whereas when a pointer variable is initialized, memory is allocated to store the address of the pointee variable.
3. Interpreted code is an implementation in which the commands are converted to machine code and executed while the program is running. Compiled code converts the commands into machine code in advance which makes them faster.
4. $0x1E = 30$ in base 10; 00011110 in base 2, msb is 0
 $0x32 = 50$ in base 10; 00110010 in base 2, msb is 0
 $0xFE = 254$ in base 10; 11111110 in base 2, msb is 1
 $0xC4 = 196$ in base 10; 11000100 in base 2, msb is 1
6. 16 bits for the address and 8 bits for the contents of the byte. Total= 24 bits
7. (a). 107
(b). 53
(c). 61
(d). 63
8. Unsigned char variables can take values 0 to 255
Short variables can take values $-32,768$ to $32,767$.
Double variables can take values $1.7e^{-308}$ to $1.7e^{308}$
10. An unsigned integer assumes the value stored to be positive and therefore has the range of 0 to 65535. A signed integer allows representation of negative values and therefore has range - 32767 to 32767. A signed integer uses one of the available bits to represent + (0) or – (1).
11. (a). Using char instead of integer will only be useful to store numbers in the range 0-255 (for unsigned). Any larger number will result in overflow. Pro: Char uses less memory space than integer.
(b). double allows representation of larger numbers and more decimals than single-precision floats. Floats use less memory and computation speed may be slightly faster.
(c). Char representation will not allow numbers with decimal points which might be a problem when dividing two numbers. Char are suitable for smaller integer values.

16. The data types long int and double occupy 8 bytes of memory and therefore are similar to “pointer to type double”.

17. (a). the initial conditions, all memory contents unknown.

(b). kp contains address of i, ie, $kp = 0xB0$

(c). j contains the contents of address kp, ie, $j = i$

(d). the contents of i now contains an address 0xAE, ie, $i = 0xAE$

(e). np set to value of kp, ie, $np = 0xB0$

(f). the contents of address of np is set to 0x12,

(g). j contains the contents of address kp, ie, $j = i$