THREE QUESTIONS

1. a) In order to use an I/O function in C such as printf(), #include <stdio.h> must be specified? What general types of information does stdio.h contain?

b) (Assuming y and x have been properly initialized), is the following statement valid in C? If so, what is the general effect?

   \[ y = (x > 0) \ ? \ x : \ -x; \]

c) What are the major differences between “a” and “b”. Specifically where are they stored in the system and what is their storage duration?

   auto int a;
   static int b;
2. The elongation of a vertical steel cable due to an applied weight can be specified as:

\[ \text{eLoad} = \frac{pl}{ae} \]

where
- \( \text{eLoad} \) - elongation (inches)
- \( p \) - applied load (pounds)
- \( l \) - length (inches)
- \( a \) - cross sectional area of the wire (square inches)
- \( e \) - modulus of elasticity (30.0E6 pounds/square inch)

Write a C program that calculates the elongation of a cable with a diameter, \( d = 0.25 \) inches, lengths \( l = 100, 200, 300, 400, \) and \( 500 \) feet, with the applied load of 400 pounds. The program should print the elongation and diameter and length of each cable. Use double values where necessary for accuracy. AS ALWAYS, INCLUDE COMMENTS FOR CLARITY.
3. Write a C program that tabulates information about new cars by employing an array of car structures. Each structure in the array is to contain the following fields about a car:

```c
char name[20];  /* Car name (Ford, Honda, etc.) */
int year;   /* Car year */
float price;   /* Car price */
```

Your program should:

a) Initialize the array of structures with information about three cars.

b) Have a function `getCarByPrice` (any arguments that you wish) that when called, prints the car information out by price, lowest to highest. The function should work for any reasonable array size (which in this case will be three.)

c) Calls the function (once) to print the sorted information for the three cars.

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