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3 of 10 QUESTIONS

QUESTION 3 5 marks

Which of the given options provides the increasing order of asymptotic complexity of functions f1, f2, f3, and f4?

$$f1(n) = 2^n$$

$$f2(n) = n^{(3/2)}$$

$$f3(n) = n*log(n)$$

$$f4(n) = n^{\log(n)}$$

f3, f2, f4, f1

f3, f2, f1, f4

f2, f3, f1, f4

f2, f3, f4, f1

Your submitted response was incorrect.

Explanation

$$f1(n) = 2^n$$

$$f2(n) = n^{(3/2)}$$

$$f3(n) = n*log(n)$$

$$f4(n) = n^{\log(n)}$$

Except for f3, all other are exponential. So f3 is definitely first in the output. Among remaining,  $n^{(3/2)}$  is next. One way to compare f1 and f4 is to take log of both functions. Order of growth of  $\log(f1(n))$  is  $\Theta(n)$  and order of growth of  $\log(f4(n))$  is  $\Theta(\log(n) * \log(n))$ . Since  $\Theta(n)$  has higher growth than  $\Theta(\log(n) * \log(n))$ , f1(n) grows faster than f4(n).

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