Question 1. Which of the following statements is *less* likely to be among the current major goals in Food Computing?

A. The ability to promote healthy eating through monitoring nutrients that we consume.

B. The ability to search foods in databases like USDA to obtain exact nutrition fact information.

C. The ability to computationally estimate/learn nutrition facts of any given food.

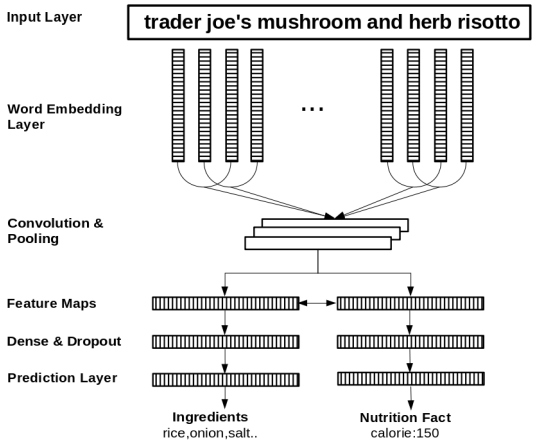
D. The ability to support applications and services such as understanding the culinary culture.

Question 1.
Answer: The correct answer is **D**.
Rationale: Risk factors such as body weight, blood pressure, and blood cholesterol can help people make informed decisions about their health promotion efforts. Food choices are among the most effective of these efforts which can help preventing chronic diseases, such as heart disease, diabetes, stroke, and certain cancers. Since different foods provide different energy and nutrients, healthy eating requires monitoring the nutrients that we consume. In addition, the availability of large-scale food datasets can transform the way individuals consume food. Food computing acquires and analyzes heterogenous food data from disparate sources for recognition, retrieval, recommendation, and monitoring of food. Recently, computational models have been developed to match given meal descriptions with foods that exists in databases. Although effective, such approaches lack the ability to deal with large amount of new foods that don't exist in databases; as reported in [1] , the average number of new foods per year is slightly less than 20K. Therefore, it is also crucial to develop computational models that can accurately estimate/learn nutrition facts of any food. However, applications such as understanding the culinary culture, although important, are currently beyond the reach of computational models and, for that reason, are probably less central in Food Computing.

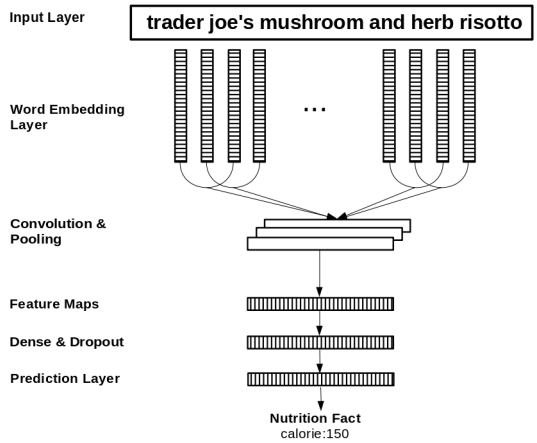
[1] US Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. USDA Branded Food Products Database. July 2018. Internet: http://www.ars.usda.gov/nutrientdata

Question 2. Assume that you would like to develop a computational model to estimate nutrition facts of given foods (a regression problem). Which of the following models (neural architectures) is likely to be more effective than others?

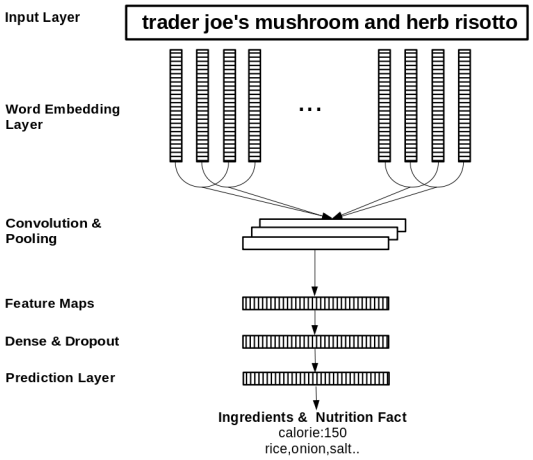
A.



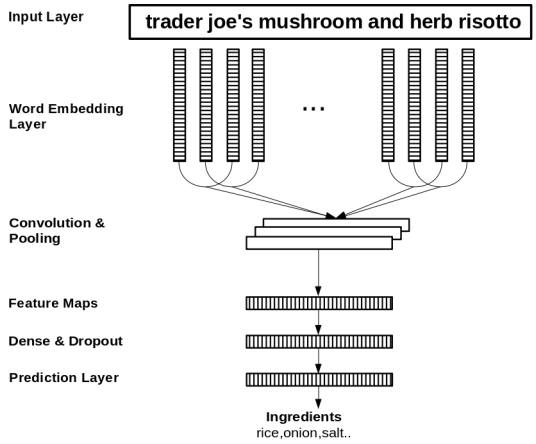
B.



C.



D.



Question 2.
Answer: The correct answer is **A**.
Rationale: Multi-task learning is a technique in which multiple tasks are jointly learned at the same time. It can lead to better generalization on individual tasks through exploiting commonalities and differences across tasks - compared to task-specific training in which models are trained separately on individual tasks. Figure A shows a multi-task learning architecture in which two related tasks (prediction of ingredients and nutrition facts) are jointly learned. Experiments show that nutrition facts of foods can be better estimated if they are jointly learned by their corresponding ingredients.