Andrew Rutherford

SID 102165328

CSCI 3104

CPU: 2.8 GHz Intel Core i7

Ram: 16 GB 1600 MHz DDR3

OSX Yosemite

<div align="center">Homework 1</div>

On my honor, as a University of Colorado at Boulder student, I have neither given nor received unauthorized assistance.

1. Driving direction:

   Input: desired destination. Output: optimal route

   Course scheduling:

   Input: desired class list. Output: course schedule.

   Google web search engine:

   Input: search query. Output: search results.

   Amazon item recommendation:

   Input: viewed item. Output: list of item recommendations.

   Fedex shipment scheduling:

   Input: ordering a package. Output: shipment schedule.

2. Chicken Parmesan (http://allrecipes.com/recipe/223042/chicken-parmesan/)

   The recipe is not as precise and unambiguous as an algorithm. The recipe has

   instructions such as "beat eggs" and "evenly coating" without going into detail of exactly

how well beaten the eggs must be, and how thick or thin the coating should be. The

ambiguity of these instructions will lead to different results depending on who follows

them. This will result in a slightly different chicken parmesan each time a different

person follows the recipe. An algorithm is more precise than a typical cooking recipe

because it accounts for any and all possible inputs, whereas a recipe simply cannot.

3.

     a. $f = \Omega(g)$

     b. $f = \Theta(g)$

     c. $f = \Omega(g)$

     d. $f = \Omega(g)$

     e. $f = \Theta(g)$

4. n=10^3:   ~0.02 sec

    n=10^4:   ~2 sec

    n=10^5:   ~373 sec

    n=10^6:   ~37,000sec*   *estimated from the smaller powers of 10

Based on these estimations, the Big-O time complexity analysis is O(n^2).

Recipe:

1. Preheat an oven to 450 degrees F (230 degrees C).
2. Place chicken breasts between two sheets of heavy plastic (resealable freezer bags work well) on a solid, level surface. Firmly pound chicken with the smooth side of a meat mallet to a thickness of 1/2-inch. Season chicken thoroughly with salt and pepper.
3. Beat eggs in a shallow bowl and set aside.
4. Mix bread crumbs and 1/2 cup Parmesan in a separate bowl, set aside.
5. Place flour in a sifter or strainer; sprinkle over chicken breasts, evenly coating both sides.
6. Dip flour coated chicken breast in beaten eggs. Transfer breast to breadcrumb mixture, pressing the crumbs into both sides. Repeat for each breast. Set aside breaded chicken breasts for about 15 minutes.
7. Heat 1 cup olive oil in a large skillet on medium-high heat until it begins to shimmer. Cook chicken until golden, about 2 minutes on each side. The chicken will finish cooking in the oven.
8. Place chicken in a baking dish and top each breast with about 1/3 cup of tomato sauce. Layer each chicken breast with equal amounts of mozzarella cheese, fresh basil, and provolone cheese. Sprinkle 1 to 2 tablespoons of Parmesan cheese on top and drizzle with 1 tablespoon olive oil.
9. Bake in the preheated oven until cheese is browned and bubbly, and chicken breasts are no longer pink in the center, 15 to 20 minutes. An instant-read thermometer inserted into the center should read at least 165 degrees F (74 degrees C).