Sandwich Creation Process

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Introduction:

This paper discusses the initial process and the improved process to make a peanut butter sandwich. The Initial outlined process has a list of pre and post conditions as well for each step. This process was then run through and observed to find places where it can be improved. An improved process was then created and run through three separate times with data recorded to test whether it actually improved the process of creating a sandwich or not.

Process Outline:

1. Get Ingredients (bread, peanut butter, knife, plate)
   1. Pre Condition: ingredients are available
   2. Post Condition: Have easy access to all ingredients
2. Spread peanut butter on one slice of bread with the knife
   1. Pre Condition: Have peanut butter, knife, and one slice of bread available
   2. Post Condition: One slice is covered with peanut butter
3. Spread peanut butter on other slice of bread with the knife
   1. Pre Condition: Have peanut butter, knife, and the other slice of bread available
   2. Post Condition: Other slice is covered with peanut butter
4. Put slice of bread with peanut butter against slice of bread with peanut butter where peanut butter and peanut butter are touching so that you maximize the area of contact
   1. Pre Condition: Have prepared slices of bread with peanut butter on them
   2. Post Condition: Have an eatable sandwich
5. Cut sandwich in half diagonally
   1. Pre Condition: Two pieces of bread are put together with peanut butter in between
   2. Post Condition: There are two triangle versions of sandwich
6. Eat sandwich
   1. Pre Condition: There is 2 halves of the sandwich to eat
   2. Post Condition: Sandwich is eaten

Initial Data Set:

|  |  |  |
| --- | --- | --- |
| Step | Time (seconds) | Quality |
| Step 1 | 6.9 | X |
| Step 2 | 26.38 | O |
| Step 3 | 24.6 | X |
| Step 4 | 1.86 | X |
| Step 5 | 9.85 | O |
| Step 6 | 135.45 | X |

Improvement Plan:

After going through the initial process I created, I discovered some flaws in the sandwich making process. The main areas where there were flaws were caused by not enough information being given to the person following the process. Below, I have revised the process in order to improve the creation of sandwiches.

1. Get Ingredients (bread, peanut butter, knife, plate)
   1. Pre Condition: ingredients are available
   2. Post Condition: Have easy access to all ingredients
2. Spread peanut butter on one slice of bread with the knife **so it covers the whole slice of bread and is perfectly level with a height of .5 cm and smooth**
   1. Pre Condition: Have peanut butter, knife, and one slice of bread available
   2. Post Condition: One slice is covered with peanut butter
3. Spread peanut butter on other slice of bread with the knife **so it covers the whole slice of bread and is perfectly level with a height of .5 cm and smooth**
   1. Pre Condition: Have peanut butter, knife, and the other slice of bread available
   2. Post Condition: Other slice is covered with peanut butter that is level throughout the bread
4. Put slice of bread with peanut butter against slice of bread with peanut butter where peanut butter and peanut butter are touching so that you maximize the area of contact
   1. Pre Condition: Have prepared slices of bread with peanut butter on them
   2. Post Condition: Have an eatable sandwich
5. Cut sandwich in half diagonally **by pressing down on top of the sandwich instead of dragging the knife through the sandwich**
   1. Pre Condition: Two pieces of bread are put together with peanut butter in between; **knife is clean**
   2. Post Condition: There are two triangle versions of sandwich
6. Eat sandwich
   1. Pre Condition: There is 2 halves of the sandwich to eat; **a glass of water/milk is available to drink while eating**
   2. Post Condition: Sandwich is eaten; **the drink is gone**

\*\* Bolded is the improved portion

Final Data Set:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Step | Time (seconds) | | | Quality | | |
| Step 1 | 4.5 | 3.9 | 5.1 | X | X | X |
| Step 2 | 19.5 | 17.6 | 17.8 | X | O | X |
| Step 3 | 18.5 | 16.6 | 17.9 | O | X | X |
| Step 4 | 1.97 | 1.2 | 1.76 | X | O | X |
| Step 5 | 7.6 | 8.3 | 7.9 | X | X | X |
| Step 6 | 150.7 | 182.4 | 165.6 | X | X | X |

Conclusions:

* Must see the process be run through is necessary in order for it to be improved
* When trying to reduce the time in step 2 and 3, spreading the peanut butter, quality decreased, but adding extra details to how it should be done helped with consistency even though it only decreased the time by six or so seconds.
* Speed in which things are done does affect the quality of the work so sometimes exchanging speed for quality is worth it

Newest Updated Capex Budget and Outsourcing:

1. Get Ingredients (bread, peanut butter, knife, plate)
   1. Pre Condition: ingredients are available
   2. Post Condition: Have easy access to all ingredients
2. **Place Peanut Butter Slice**
   1. Pre Condition: Have peanut butter slice
   2. Post Condition: One slice is covered with peanut butter
3. Put slice of bread with peanut butter against slice of bread where peanut butter and other side of bread are touching so that you maximize the area of contact
   1. Pre Condition: Have prepared slices of bread with peanut butter and the other plain slice of bread.
   2. Post Condition: Have a full, eatable sandwich
4. **Cut sandwich in four different pieces in a cross manner**
   1. Pre Condition: Two pieces of bread are put together with peanut butter in between
   2. Post Condition: There are four smaller versions of sandwich
5. Eat sandwich
   1. Pre Condition: There is 4 pieces of the sandwich to eat tester only eats one; a glass of water/milk is available to drink while eating
   2. Post Condition: Quarter of sandwich is eaten and three quarters are left for distribution to users; the drink is gone;

As before, we decided to show the updates by bolding the lettering. As far as our major changes, we saved a bunch of time when it came to the spreading of the peanut butter. We decided to use slices of peanut butter in order to cut the time it would take to spread. This also ensures quality and consistency for each sandwich. Furthermore, we decided to cut the sandwich into four pieces and only need ¼ of the sandwich in order to test using a special pizza cutting utensil that cuts down our slicing time as well as providing consistent quality with every cut. We can then distribute the rest of the sandwich to our customers, which was a problem before. Even we have changed the process in order to save time as well as outsourcing to countries that cost ¾ less than local manufactures, we were still over budget. The outsourcing significantly decreased our overhead, but still didn’t get us within budget. The real issue with the offshore team is having 3x quality issues. We would need to add another team offshore in order to account for the 30% loss in product. In the end, this could add up to $1 million dollars extra (the entirety of our budget). Even though the offshore team is 25% cost compared to the local team, that 30% error is a detrimental hit to our development and budget.

Code Review:

Questions

1. Are classes, functions, and variables named properly?
   1. Yes; well named, in-depth function names to understand what is actually occurring in the code;
2. Can the classes/functions be further broken into small classes/functions?
   1. No; they are unit-oriented functions;
3. Is the code properly formatted?
   1. Yes; indentations, brackets, spacing, etc. all formatted cleaning and makes code readable;
4. Does the code compile?
   1. Yes;
5. Are there memory leaks? Is memory utilization normal?
   1. No; Yes;

The code for the overall simulation is well structured and very readable. Very well commented so that made the whole process easy when there was any confusion with any part of the code that I didn’t immediately understand. This what due to the fact that the names were so clear that it was very easy to understand what each part of the program purpose is. I was not able to find code smells or anything that would require any serious refactoring.