P3: Food Planner

A Software Analysis and -Implementation

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Agenda

Intro

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Content

- Causes
- Problem Statement
- XAML
- Code Exammples
- Unit Testing
- Usability Test
- Reflection

Problem statement & Information Gathering

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Problem statement

- How can a software system assist the consumer in planning and managing a meal plan to minimize food waste and simultaneously be flexible enough to support their planning, shopping and cooking habits?

Information Gathering

-

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Quality Assurance

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Quality assurance

Fulfilling the semester description

- Quality assurance (in terms of program testing and results and usability evaluation and results), including arguments for coverage and validity (Semester description)
  - Program testing = Unit testing
  - Usability evaluation = IDA (report section 11)

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Unit Testing

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Unit testing
What is unit testing?

- Initial stage of program testing
- Isolate smallest testable code
- Confirm if the unit behaves correctly

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Unit testing

Possible candidates for unit testing

- Classes e.g. User, Ingredient or Recipe
  - Testing their properties or methods
- List of candidates
  - MODELS
  - Graylist
  - Ingredient
  - InventoryIngredient*
  - InventoryListCombinedByQuantity
  - LastMeal
  - PublicQuerys
  - Recipe
  - RecipeIngredient
  - SearchResults
  - ShoppingClass
  - ShoppingListIngredient
  - User
  - VIEWMODELS
  - InventoryViewModel*
  - MealPlanViewModel
  - RecipeSearchViewModel

Unit testing

Code from InventoryIngredientTests.cs

```
[TestMethod]
public void
    PurchaseDate_AutoSetConstructor_SetToNow() {
//arrange
Ingredient testIngredient = new Ingredient();
DateTime expectedPurchaseDate = DateTime.Now;

//act - The property is set automaticly in the
    constructor
InventoryIngredient testInventoryIngredient = new
    InventoryIngredient(testIngredient, 750);
//assert
Assert.AreEqual(expectedPurchaseDate,
    testInventoryIngredient.PurchaseDate);
}
```

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Usability Testing

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IDA

- 3 persons
- Video camera
- Screen recorder
- Follow-up questions

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IDA outcome

- Critical problems
  - Scheduled meal page, update button
  - Deleting meal
  - Automatical or manual update
- Serious problems
  - Planning meal the wrong way
  - Top bar in recipe screen
  - Changing the number of days to shop for
- Cosmetic problems
  - Dividing of setting screen
  - Adding ingredient to lists
  - Too specific rating

Usability notes

- Waterfall vs Iterative

Reflection

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missing features

-

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Optimization

Minimize communication between server and client

- Search algorithm
  - .ToList()
- Cashing
  - Save meals locally
  - Local list of inventory
  - Better allowance of off-line usage

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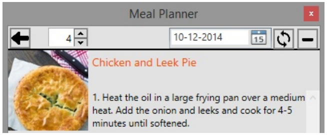
Evaluation of design

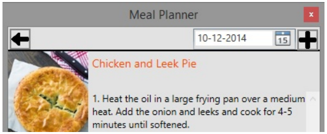
- Scheduled meal page, update button



Chicken and Leek Pie

1. Heat the oil in a large frying pan over a medium heat. Add the onion and leeks and cook for 4-5 minutes until softened.

- Deleting meal



Chicken and Leek Pie

1. Heat the oil in a large frying pan over a medium heat. Add the onion and leeks and cook for 4-5 minutes until softened.

Requirements

Problem based requirements:

- To much food being wasted
- Miscalculations happen in groups
- Shopping is time consuming
- Diets are difficult
- Consumers living alone have the most food waste
- Consumers living alone have a higher cost per meal

The two main problems:

- Planning and managing meals
- Minimizing food waste

Requirements

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Code Examples

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Sorting

- Percentage Full Match
- Percentage Partial Match
- Rating
- Previous Ingredients
- Recipe Title

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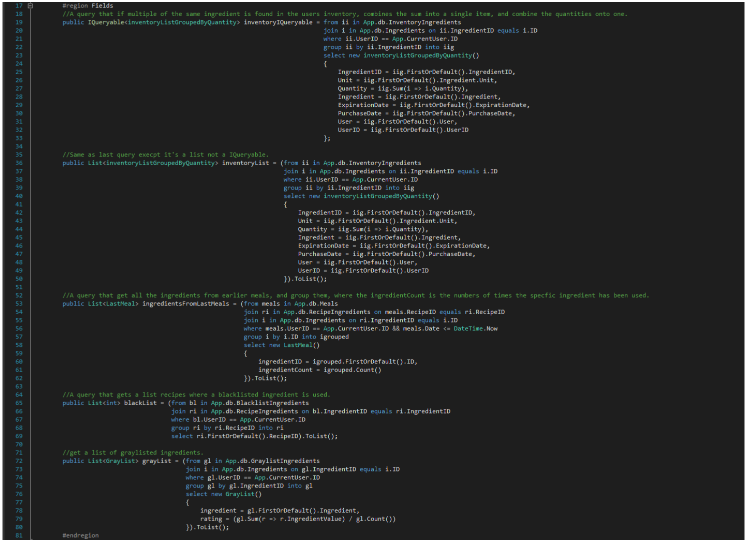
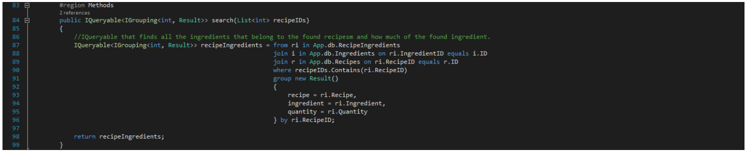
PublicQuerys



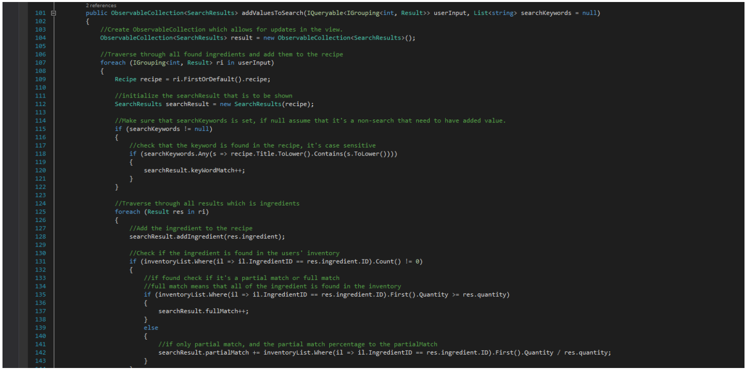
```
        #region Fields
        //A query that if multiple of the same ingredient is found in the users inventory, combines the sum into a single item, and combine the quantities onto one.
        public IQueryable<inventoryListGroupedByQuantity> inventoryIQueryable = from ii in App.db.InventoryIngredients
                                                                                 join i in App.db.Ingredients on ii.IngredientID equals i.ID
                                                                                 where ii.UserID == App.CurrentUser.ID
                                                                                 group ii by ii.IngredientID into iig
                                                                                 select new inventoryListGroupedByQuantity()
                                                                                 {
                                                                                     IngredientID = iig.FirstOrDefault().IngredientID,
                                                                                     Unit = iig.FirstOrDefault().Ingredient.Unit,
                                                                                     Quantity = iig.Sum(i => i.Quantity),
                                                                                     Ingredient = iig.FirstOrDefault().Ingredient,
                                                                                     ExpirationDate = iig.FirstOrDefault().ExpirationDate,
                                                                                     PurchaseDate = iig.FirstOrDefault().PurchaseDate,
                                                                                     User = iig.FirstOrDefault().User,
                                                                                     UserID = iig.FirstOrDefault().UserID
                                                                                 };

        //Same as last query execpt it's a list not a IQueryable.
        public List<inventoryListGroupedByQuantity> inventoryList = (from ii in App.db.InventoryIngredients
                                                                     join i in App.db.Ingredients on ii.IngredientID equals i.ID
                                                                     where ii.UserID == App.CurrentUser.ID
                                                                     group ii by ii.IngredientID into iig
                                                                     select new inventoryListGroupedByQuantity()
                                                                     {
                                                                         IngredientID = iig.FirstOrDefault().IngredientID,
                                                                         Unit = iig.FirstOrDefault().Ingredient.Unit,
                                                                         Quantity = iig.Sum(i => i.Quantity),
                                                                         Ingredient = iig.FirstOrDefault().Ingredient,
                                                                         ExpirationDate = iig.FirstOrDefault().ExpirationDate,
                                                                         PurchaseDate = iig.FirstOrDefault().PurchaseDate,
                                                                         User = iig.FirstOrDefault().User,
                                                                         UserID = iig.FirstOrDefault().UserID
                                                                     }).ToList();

        //A query that get all the ingredients from earlier meals, and group them, where the ingredientCount is the numbers of times the specfic ingredient has been used.
        public List<LastMeal> ingredientsFromLastMeals = (from meals in App.db.Meals
                                                          join ri in App.db.RecipeIngredients on meals.RecipeID equals ri.RecipeID
                                                          join i in App.db.Ingredients on ri.IngredientID equals i.ID
                                                          where meals.UserID == App.CurrentUser.ID && meals.Date <= DateTime.Now
                                                          group i by i.ID into igrouped
                                                          select new LastMeal()
                                                          {
                                                              ingredientID = igrouped.FirstOrDefault().ID,
                                                              ingredientCount = igrouped.Count()
                                                          }).ToList();

        //A query that gets a list recipes where a blacklisted ingredient is used.
        public List<int> blackList = (from bl in App.db.BlacklistIngredients
                                      join ri in App.db.RecipeIngredients on bl.IngredientID equals ri.IngredientID
                                      where bl.UserID == App.CurrentUser.ID
                                      group ri by ri.RecipeID into ri
                                      select ri.FirstOrDefault().RecipeID).ToList();

        //get a list of graylisted ingredients.
        public List<GrayList> grayList = (from gl in App.db.GraylistIngredients
                                          join i in App.db.Ingredients on gl.IngredientID equals i.ID
                                          where gl.UserID == App.CurrentUser.ID
                                          group gl by gl.IngredientID into gl
                                          select new GrayList()
                                          {
                                              ingredient = gl.FirstOrDefault().Ingredient,
                                              rating = (gl.Sum(r => r.IngredientValue) / gl.Count())
                                          }).ToList();
        #endregion
```

Search by recipes



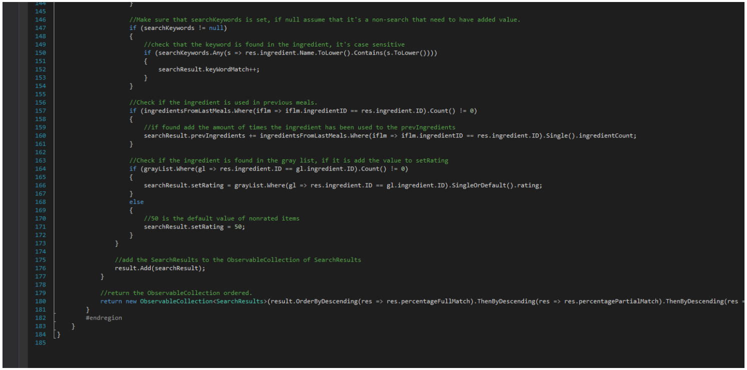
```
#region Methods
2 references
public IQueryable<IGrouping<int, Result>> search(List<int> recipeIDs)
{
    //IQueryable that finds all the ingredients that belong to the found recipesm and how much of the found ingredient.
    IQueryable<IGrouping<int, Result>> recipeIngredients = from ri in App.db.RecipeIngredients
                                                           join i in App.db.Ingredients on ri.IngredientID equals i.ID
                                                           join r in App.db.Recipes on ri.RecipeID equals r.ID
                                                           where recipeIDs.Contains(ri.RecipeID)
                                                           group new Result()
                                                           {
                                                               recipe = ri.Recipe,
                                                               ingredient = ri.Ingredient,
                                                               quantity = ri.Quantity
                                                           } by ri.RecipeID;

    return recipeIngredients;
}
```

Sorting of results



```
2 references
public ObservableCollection<SearchResults> addValuesToSearch(IQueryable<IGrouping<int, Result>> userInput, List<string> searchKeywords = null)
{
    //Create ObservableCollection which allows for updates in the view.
    ObservableCollection<SearchResults> result = new ObservableCollection<SearchResults>();

    //Traverse through all found ingredients and add them to the recipe
    foreach (IGrouping<int, Result> ri in userInput)
    {
        Recipe recipe = ri.FirstOrDefault().recipe;

        //initialize the searchResult that is to be shown
        SearchResults searchResult = new SearchResults(recipe);

        //Make sure that searchKeywords is set, if null assume that it's a non-search that need to have added value.
        if (searchKeywords != null)
        {
            //check that the keyword is found in the recipe, it's case sensitive
            if (searchKeywords.Any(s => recipe.Title.ToLower().Contains(s.ToLower())))
            {
                searchResult.keyWordMatch++;
            }
        }

        //Traverse through all results which is ingredients
        foreach (Result res in ri)
        {
            //Add the ingredient to the recipe
            searchResult.addIngredient(res.ingredient);

            //Check if the ingredient is found in the users' inventory
            if (inventoryList.Where(il => il.IngredientID == res.ingredient.ID).Count() != 0)
            {
                //if found check if it's a partial match or full match
                //full match means that all of the ingredient is found in the inventory
                if (inventoryList.Where(il => il.IngredientID == res.ingredient.ID).First().Quantity >= res.quantity)
                {
                    searchResult.fullMatch++;
                }
                else
                {
                    //if only partial match, and the partial match percentage to the partialMatch
                    searchResult.partialMatch += inventoryList.Where(il => il.IngredientID == res.ingredient.ID).First().Quantity / res.quantity;
                }
```

Sorting of results



```
                    }

                    //Make sure that searchKeywords is set, if null assume that it's a non-search that need to have added value.
                    if (searchKeywords != null)
                    {
                        //check that the keyword is found in the ingredient, it's case sensitive
                        if (searchKeywords.Any(s => res.ingredient.Name.ToLower().Contains(s.ToLower())))
                        {
                            searchResult.keyWordMatch++;
                        }
                    }

                    //Check if the ingredient is used in previous meals.
                    if (ingredientsFromLastMeals.Where(iflm => iflm.ingredientID == res.ingredient.ID).Count() != 0)
                    {
                        //if found add the amount of times the ingredient has been used to the prevIngredients
                        searchResult.prevIngredients += ingredientsFromLastMeals.Where(iflm => iflm.ingredientID == res.ingredient.ID).Single().ingredientCount;
                    }

                    //Check if the ingredient is found in the gray list, if it is add the value to setRating
                    if (grayList.Where(gl => res.ingredient.ID == gl.ingredient.ID).Count() != 0)
                    {
                        searchResult.setRating = grayList.Where(gl => res.ingredient.ID == gl.ingredient.ID).SingleOrDefault().rating;
                    }
                    else
                    {
                        //50 is the default value of nonrated items
                        searchResult.setRating = 50;
                    }
                }

                //add the SearchResults to the ObservableCollection of SearchResults
                result.Add(searchResult);
            }

            //return the ObservableCollection ordered.
            return new ObservableCollection<SearchResults>(result.OrderByDescending(res => res.percentageFullMatch).ThenByDescending(res => res.percentagePartialMatch).ThenByDescending(res =
        }
        #endregion
    }
}
```