Foodly Budget Application Development on Android Platform

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ABSTRACT

A person often eat outside the home for various reasons, whether for reasons of practicality, not had time to cook at home, and because Affairs job. When eating outside the home, a person often choose or seek a price of the food in accordance with the cost or budget. However, there are some problems encountered when foraging outside someone sometimes do not know how the estimated budget to be issued so that sometimes the money is insufficient or sometimes does not always know the price of food at the places they will visit then happened is insufficient with regard to the budget to buy food. Masalahpun plus when it wants friends or closest person treats sometimes confused to find a place that fits our budget. The lack of media especially in sharing information on dining fees beyond the hinder culinary search in determining an approximate budget of the food to be issued, because the information on the internet very much and not focused, any information obtained is not necessarily in accordance with the conditions that chill both in terms of budget/cost.

Case Based Reasoning (CBR) is a method used to recommend places to eat outside of the appropriate budget based on previous *experiences.* Based on the results of testing this method is quite helpful in finding a place to eat in accordance with the budget that is in want.

Kata kunci : *Case Based Reasoning*, *Budget*, Tempat Makan,

1. INTRODUCTION

In daily life foods is one of the basic needs for human, food can be a medium for conveying the gratitude, deepen kinship rituals, and others. Speaking of the food is very diverse, ranging from snacks to great food. With the need for food on every human being, making food into a business opportunity for some people to sell food.

A person often eat outside the home for various reasons, whether for reasons of practicality, not had time to cook at home, and because Affairs job. When eating outside the home, you choose or seek a price of the food in accordance with the cost or budget you.

Any problem plus when we want friends or closest person treats sometimes we get confused to find places to eat to suit our budget. It needs proper planning estimated budget to eat outside because it will be a problem if it occurs over budgeting. Plus when someone eating less often outside know how total costs that have been incurred when choosing to eat outside so the importance of evaluation expenses. The lack of media especially in sharing information on dining fees beyond the hinder us in determining the estimated budget of the food to be issued, because the information on the internet very much and not focused, any information obtained is not necessarily in accordance with the conditions that chill both in terms of budget/cost. For people who often foraging outside the required recommendations and calculation of the cost of the right to food that will be targeted.

From the results of a questionnaire that had already been done to the 110 respondents, 45.7 percent of respondents said getting information recommendations of places to eat from the website and social media.

In addition most dining search beyond the difficulties in determining the approximate budget when they want to eat outside. So sometimes the money is insufficient. Based on the results of a survey conducted to 110 respondents, 70 percent of respondents do not always know the price of food at the places they will visit happened is insufficient with regard to the budget to buy some food and treats.

Consumers need the media to tell them about eating outside which is not merely to provide information but should be more than that. 110 respondents, 70.9 percent strongly agree they need media that deliver the right information ranging from location information, place name, appropriate location dining recommendations or preferred type of food and the more important the longer dining recommendations that fit the budget.

In recommending eating somewhere outside the required some criteria and the results of recommendations based on the experiences of people who never eat outside before. One method that is suitable to provide the results of the recommendation to use solution previous problems are similar, that the method of Case-Based Reasoning (CBR) [1].

Based on the problems that have been presented, then it can be concluded the necessity of constructing software Foodly Budget on mobile platforms. As for the platform used in building this software is android with the consideration that the number of android users in Indonesia until 2016, 45.9 and android is the operating system that dominates the smartphone circulation in Indonesia.

Based on the exposure of the background problems, then the formulation of problems found in the study was how to build software Foodly Budget on the android platform that could find a place to eat and also evaluate the budget expenditure budget when eating outside.

Based on the issues examined, then the point of writing this final task is to build applications on the Android Platform Foodly Budget. As for the goals of this research are as follows:

1. Search places to eat outside help to gain information on the food budget.
2. Help to evaluate the expenditure budget when eating outside.

1.1 Food

The food is an ingredient, usually derived from animals or plants, which are eaten by living things obtain energy and nutrients. The liquid used for this purpose is often called a drink. The required human food is usually obtained from the results of farming or gardening supplies which include plant and animal sources. Some people refuse to eat food from animals like meat, eggs, and others. Those who don't like to eat meat, and the like are called vegetarians, namely people who only eat vegetables as their staple food.

1.2 User Generated Content

User Generated Content is to refer to the various types of material content or media that is available to the public and produced by end-users or the non-media professionals. Advances in technology enabling web content. the website is no longer monopolized by professional media, but can be created by its users. Using User Generated Content (UGC) is also a great way to build relationships and loyalty Your follower. If they see You paying attention to what they say, they will be more excited with Your brand [2].

1.3 Android

Android is a Linux-based operating system for cell phones such as smart phones (Smartphones) and tablet computers. Android provides an open platform for developers to create their own applications to be used by various devices begerak. First Android phone went on sale in October 2008. The Android OS has an excellent, fast and strong and has intuitive user interface which is packed with options and flexibility. Android SDK (Software Development Kit) provides the tools and APIs necessary to develop applications on the android platform using the Java programming language [3].

1.4 Recommendations

Recommendation system is a model of the application of the results of observations against the circumstances and wishes of the customer. Therefore the recommendation system requires proper recommendations so that model is recommended in accordance with the wishes of the customer, as well as facilitate the customers take the right decision in determining the products that will be used.

1.5 Case Based Reasoning

Case-Based Reasoning is a method of solving problems by using a solution of the problems of the previous similar. Components troubleshooting CBR has two main parts: a case retriever and case reasoner. Case retriever tasked to look for issues that are similar to the problems that put the user in the knowledge base (base case), while case reasoner on duty to find solutions of problems users with view or customize solution kaso retriever problem found [4].

In their execution, there are four stages in the process of CBR [4] :

1. Retrieve: take old cases from case base similar to the case at hand.
2. Reuse: using a solution of old cases that retrieve results to complete the new cases..
3. Revise: if necessary, adapt the old case solutions to suit the conditions of the new issue.
4. Retain: saving solutions that have been validated the revised results into the database, so that it can be used to solve similar problems in the future.

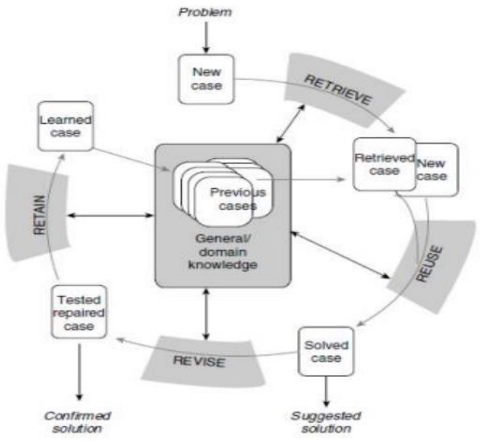


Figure 1 Cycle Method Case Based Reasoning

1.6 Algorithm

Nearest Neighbor Retrieval algorithms (nearest neighbor or NN) algorithm to perform the classification based on learning object against which are closest to the object. Formula to calculate

weighted similarity (similarity) with nearest neighbor is [1]:

$$\text{Similarity}(p, q) = \frac{\sum_{i=1}^{n} f(Pi\ Qi) * Wi}{\sum_{i=1}^{n} Wi} \quad (1)$$

1.7 JSON

JSON (JavaScript Object Notation) is a lightweight data interchange format, easy to read and written by humans, as well as easily translated and made (generate) by computer. This format is based on the JavaScript Programming language, Standard ECMA-262 3rd Edition-December 1999. JSON is a text format that is not dependent on any programming language because it uses the style language that is commonly used by programmers family C include C, C++, C #, Java, JavaScript, Perl, Python etc. Because of these properties, making it ideal as a JSON data exchange language [5].

1.8 Black Box

Black box testing is the complementary approaches of engineering white box, black box testing because it is expected to unveil a broader class of errors compared to the white box techniques. Black box testing is a fundamental aspect of system testing regardless of the structure of the internal logic of the software. This method is used to determine whether the software is functioning correctly. Black box testing is a method of designing a test data based on the specifications of the software. Test data are generated, executed at the software and then the output of the software to check whether it has been as expected. Black box testing trying to find fault in the category :

1. Functions that are not correct or missing.
2. Errors interface.
3. Errors in data structures or external database access
4. Error performance
5. Initialization and termination error.

Unlike the white box testing is done at the beginning of the process of testing, black box testing tend to be applied during the final stages of testing. Because black box testing of the control structure, then the attention focused on the domain information.

By applying the techniques of black box, then it can drag out a series of test cases that meet the following criteria:

1. Test case which reduces, at a price of more than one, the number of additional test case must be designed to achieve responsive testing.
2. Test case that tells something about the presence or absence of the error class rather than tell the error that is associated only with the specific testing of existing.

2. CONTENT OF RESEARCH

2.1 The Analysis of Case Based Reasoning

The facts in the form of the previous cases that ever existed and a series of grooves for checking, counting, and concluded a solution of the given problem are the base of knowledge on case-based reasoning. Stages in case-based reasoning there are 4 namely: retrieval, reuse, revised and retain.

In phase retrieval and reuse the search solutions conducted the case. In the basic search returns the case to the degree of similarity of the input cases are approaching the budget provided the user with existing cases in the knowledge base to search for cases which have the equation (similaritas). Only cases which have the equation (similaritas) with the base case will be processed in the stages of reuse for recommended solutions for new cases. On the stages of the revised and retain which is the phase where the solution given to the user before finally decided to make new knowledge or not. Can be seen in Figure 1 below:

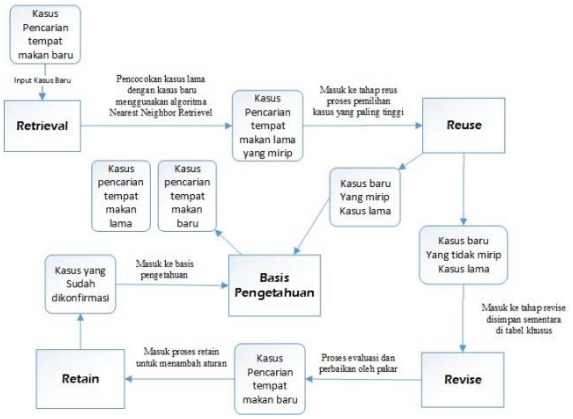


Figure 2 Stages of The Method of Case Base Reasoning

A. Retrieval

Retrieval to retrace the old cases that most resembles the new cases. Matching is done by means of menginputkan search data. If the matching value weighted cases same or almost the same as the base case, it will be done the stage of reuse that is doing the calculation of similarity of the weighting of each attribute to generate possible solutions from new cases. This weighting value is provided as an overview of how important those attributes in the determination of solutions of the same case. An attribute that belongs to each case is a food Budget, the type of food. Following is table 1 data attribute and its value.

Table 1 The Name and Value Attributes

NO	Attribute Name	Attribute Value
1	Food Costs	a. BM1 : Cost more than Rp. 0 – 50.000

		b. BM2 : Cost more than Rp. 50.001 - 100.000 c. BM3 : Cost more than Rp. 100.001 - 200.000 d. BM4 : Cost more than Rp. 200.001 - 300.000 e. BM5 : Cost more than Rp. 300.001
2	Types of Food	a. Indonesian Food b. Western Food c. Chinese Food d. Thailand Food e. Japanese Food

In this research the budget food, type of food, and the distance was given more weight on every attribute retrieved from the results kueisoner. Here is table 2 name and value attribute weighting.

Table 2 The Name and Value Attribute Weighting

Attribute Name	Weights	Percentage (weights x 100%)
Food Costs	0.60	60%
Types of Food	0.30	30%
Distance	0.10	10%

The value of the similarity of taste sorts of foods in which categories each food that has flavor that is almost similar to will have a considerable proximity values obtained from the results of the questionnaire. Here is the similarity values table 3 type of food.

Table 3 The Value of The Similarity of The Type of Food

Immediacy	Indonesian	China	Japan	Western	Thailand
Indonesian	1	0.6	0.4	0.3	0.6
China	0.6	1	0.7	0.3	0.5
Japan	0.4	0.7	1	0.3	0.4
Western	0.3	0.3	0.3	1	0.3
Thailand	0.6	0.5	0.4	0.3	1

The proximity of the attribute value budget food where the food budget has attributes similar to the closeness would have had considerable proximity value. The following is a table of 4 the proximity of budget meals.

Table 4 The Immediacy of Food Budget

Immediacy Budget	BM1	BM2	BM3	BM4	BM5
BM1	1	0.6	0.4	0.2	0
BM2	0.6	1	0.6	0.3	0.1
BM3	0.4	0.6	1	0.5	0.2
BM4	0.2	0.3	0.5	1	0.5
BM5	0	0.1	0.2	0.5	1

The proximity distance which had a distance almost close the immediacy of value will have its big enough. The following is a table of 5 distances.

Table 5 Distance

Distance Neme	Distance	Value
Distance 1	0 – 1 km	1
Distance 2	1.1 – 2 km	0.8
Distance 3	2.1 – 3 km	0.6
Distance 4	3.1 – 4 km	0.4
Distance 5	4.1 – 5 km	0.2
Distance 6	Lebih dari 5.1 km	0

In search of the Nearest Neighbor, the proximity of these features cases will also be counted. The value of proximity is usually located on the value 0 to 1 where the value 0 means that the second case is not similar to while a value of 1 means that both cases are similar. Penelusuranan this application using the technique of Similarity (problem, case) at the nearest neighbor algorithm is as follows :

$$\text{Similarity}(p, q) = \frac{\sum_{i=1}^{n} f(Pi\ qi) * Wi}{\sum_{i=1}^{n} Wi}$$

Description :
P : New Case
q : Existing cases in storage
n : Number of attributes in each case
i : The attributes of the individual between 1 up to n
f : The function of the similarity of attributes I between P and q case.
W : The weighting given to the i attribute.

Case search where to eat, where already there are 4 pieces of the case as a knowledge base can be seen in table 6 Examples of search Knowledge base and 1 piece of the new cases to search for similarities.

Table 6 Knowledge Base

NO	The Old Case ID	Title	Type of Food	The Number of People
1	1	RM. Ibu Haji Cijantung	Indonesian Food	5
2	2	Waroenk Steak	Western Food	3
3	3	Sushi	Japanese Food	4
4	4	Nasi Goreng Mafia	Indonesian Food	4

Table 7Longitude dan latitude	Budget Rp.
Longitude: 107,620055 Latitude: -6,929690	100.000
Longitude: 107,616362 Latitude: -6,889983	100.000
Longitude: 107,615446 Latitude: -6,882761	200.000
Longitude: 107,616958 Latitude: -6,891036	200.000

Tabel 1 New Case

NO	Old Case ID	Title	Type of Food	Longitude dan latitude	Budget Rp.
1	X		Indonesian Food	Longitude : 107,619360 Latitude: -6,929690	200.000

Table 8 Value Attributes Case X dan 1

Case Id : X	Similarity	Case Id : 1
BM3 : Rp. 200.000	0.6	BM2 : Rp. 100.000
Indonesian Food	1	Indonesian Food
Case Distance X	1 / 800 M	Jarak Kasus 1

Table 9 The Value of Attribute Weighting

Budget	Type of Food	Distance
0.6	0.3	0.1

$$\text{Similarity}(X, 1) = \frac{(S1*W1) + (S2*W2) + (S3*W3)}{W1 + W2 + W3}$$

$$= \frac{(0.6*0.6) + (1*0.3) + (1*0.1)}{0.6 + 0.3 + 0.1}$$

$$= \frac{0.36 + 0.3 + 0.1}{1}$$

$$= \frac{0.76}{1} = 0.76$$

Table 10 Value Attributes Case X dan 2

Case Id: X	Similarity	Id Kasus : 2
BM3 : Rp. 200.000	0.5	BM4 : Rp. 300.000
Indonesian Food	0.3	Western Food
Case Distance X	1 / 800 M	Case Distance 2

Table 11 The Value of Attribute Weighting

Budget	Type of Food	Distance
0.6	0.3	0.1

$$\text{Similarity}(X, 1) = \frac{(S1*W1) + (S2*W2) + (S3*W3)}{W1 + W2 + W3}$$

$$= \frac{(0.5*0.6) + (0.3*0.3) + (1*0.1)}{0.6 + 0.3 + 0.1}$$

$$= \frac{0.3 + 0.09 + 0.1}{1}$$

$$= \frac{0.49}{1} = 0.49$$

Table 12 Value Attributes Case X dan 3

Case Id : X	Similarity	Case Id : 3
BM3 : Rp. 200.000	1	BM3 : Rp. 200.000
Indonesian Food	0.4	Japanese Food
Case Distance X	1 / 900 M	Case Distance 3

Table 13 The Value of Attribute Weighting

Budget	Type of Food	Distance
0.6	0.3	0.1

$$\text{Similarity}(X, 1) = \frac{(S1*W1) + (S2*W2) + (S3*W3)}{W1 + W2 + W3}$$

$$= \frac{(1*0.6) + (0.4*0.3) + (1*0.1)}{0.6 + 0.3 + 0.1}$$

$$= \frac{0.6 + 0.12 + 0.1}{1}$$

$$= \frac{0.82}{1} = 0.82$$

Table 14 Value Attributes Case X dan 4

Case Id : X	Similarity	Case Id : 4
BM3 : Rp. 200.000	1	BM3 : Rp. 200.000
Indonesian Food	1	Indonesian Food
Case Distance X	1 / 750 M	Case Distance 4

Table 15 The Value of Attribute Weighting

Budget	Type of Food	Distance
0.6	0.3	0.1

$$\text{Similarity}(X, 1) = \frac{(S1*W1) + (S2*W2) + (S3*W3)}{W1 + W2 + W3}$$

$$= (1*0.6) + (1*0.3) + (1*0.1)$$

$$\frac{}{0.6 + 0.3 + 0.1}$$

$$= \frac{0.6 + 0.3 + 0.1}{1}$$

$$= \frac{1}{1} = 1$$

B. Reuse

Dari hasil perhitungan di tahap retrive kemudian diperoleh nilai-nilai kemiripan tiap kasus.

Table 16 The value of the similarity comparison cases

No	New Case Id	Value of *Similarity* Kasus Baru (X) dan kasus lama	Percentage (Nilai Similarity x 100%)	Old Case Id
1	X	0.76	76%	1
2	X	0.49	49%	2
3	X	0.82	82%	3
4	X	1	100%	4

Then from the above search results in the get dining recommendations result is:

Table 17 Dining recommendations

No	Old Case Id	Tempat Makan	Percentage of Similarity
1	4	Nasi Goreng Mafia	100%
2	3	Sushi	82%
3	1	RM. Ibu Haji Cijantung	76%
4	2	Waroenk Steak	49%

C. Revise

In the first case the highest level of similarity solutions produces 100% display (old case Id 4) as the first recommendation, 82% is showing (old case Id 3) second recommendation, 76% showing (old case Id 1) third recommendation, and 49% showing (old case Id 2) fourth recommendation.

But if it turns out that after calculation and find a case that is similar under 30% with the new case then do the revised process. Information in the form of input in the case of the new plan is similar under 30% with knowledge base (rule) that accommodated at a special table (table of the revised) which will then be evaluated and corrected. Revision solutions based on user input (feedback).

Table 18 Tabel Revise

NO	Case ID	Type of Food	Budget Rp.
1	X	Indonesian Food	50.000

Table 19 Tabel Revise Evaluated/ Fixed

NO	Case ID	Title	Type of Food	people
1	X	Bakso Boedjangan	Indonesian Food	2

Longitude dan latitude	Budget Rp.
Longitude: 107,612970 Latitude: -6898576	36.000

D. Retain

At this stage the expert (admin) began adding rules to include new case data already found the solution into a knowledge base that will be used for subsequent cases which have the same problems..

2.2 Functional Requirements analysis

A. Use Case Diagram

Use Case Diagram is a construction to describe relationships that occur between actors with activities that are present in the system. The target use case modeling such as defining the functional needs and operational systems by defining a usage scenario agreed between users and developers.

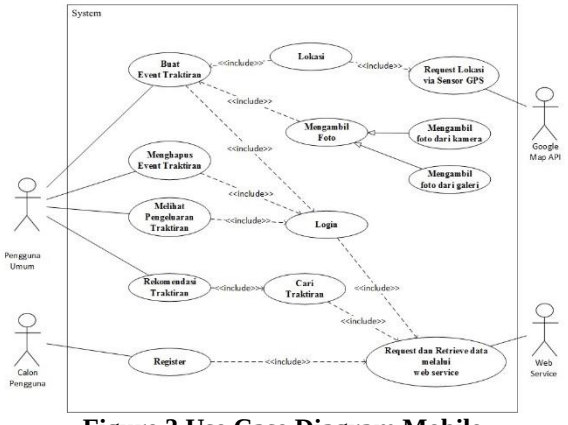


Figure 3 Use Case Diagram Mobile

B. Class Diagram

Class diagram illustrates the structure of the system in terms of pendefinisisan classes will be created to build the software. Image Class diagram shows the class structure that is related to the other class.

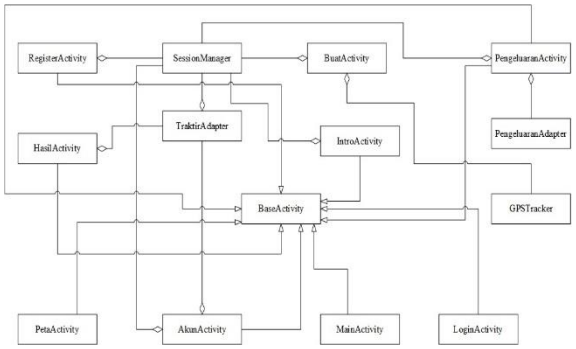


Figure 4 Class Diagram

2.3 Perancangan Sistem

A. Scheme relation

Relationship scheme is a series of relationships between multiple tables in a database system. Circuit description of the database in the system.

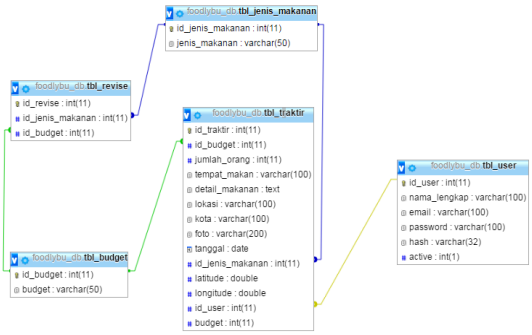


Figure 5 Kema Relasi

B. The Design of The Menu Structure

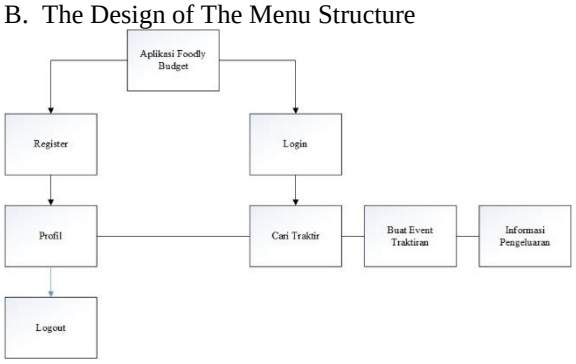


Figure 6 The Design of The Menu Structure

2.4 Testing The System

System testing is the most important thing that aims to find the mistakes or shortcomings in the application being tested. Testing is used to test the new system is a black box testing methods. Black box testing is focused on testing the functional requirements for information systems.

Table 20 Plan Alpha Testing

Material Test	Grain Testing	Types of Tests
Register	Data validation registers	*Black box*
	New account activation	
	Save data register into the database	
Login	Input data login	*Black box*
	Data validation login	
Find Traktiran	Choice of data for	*Black box*
	For data validation	
	Display recommendations	
Create event Traktiran	Input data traktiran	*Black box*
	Data validation traktiran	
	Saving data traktiran to database	
Delete Event Traktiran	Displays the delete confirmation messages	*Black box*
	Agree delete confirmation messages	
	Delete data in the database	
See expenses Traktiran	Displays the amount of the expenditure	*Black box*
Add Locatioan	Add a location	*Black box*
Add Photo	Take pictures through the camera	*Black box*
	Take pictures through the galleries	
	Add data to the database	
Display History event traktiran	Display History traktiran	*Black box*

3. CONCLUSION

Based on the test results and discussion has been made then the following conclusions can be drawn:

1. This application is quite capable of showing recommendations for places to eat in accordance with the budget that is in want of its users.
2. This application can also evaluate the expenditure of users per foraging outside the.

Foodly Budget software that has been developed can already solve the problem at hand. As for the advice against Foodly software development Budget are as follows:

1. The method of granting the recommendation no longer only uses 2 types of options data (budget, types of foods) but it can be expanded by adding

options like any desired category when looking for a place to eat outside so that users can look for more specific data again.

2. Information such as positive comments/testimonials customers against the recommendations of food so that the attractiveness of the recommendations presented would be more attractive in the eyes of customers or prospective customers.

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