

BBM007 Business Internet Systems assignment

Task One

The Country Wide Activity Centre is a health spa, which runs residential activity weeks for groups or individuals who are seeking to improve their health and diet. Country Wide gathers data on individuals as they attend various seminars and activities during the residential, which is then combined with information about the food they eat and their diet to provide feedback to the clients as they progress.

Keeping track of the client information requires a database, which monitors the information given above and then generates a statistical profile from pre built queries.

Example:

Robert Taunton Consultants has booked 5 staff into a week long residential, and supplies personal contact information along with their occupation, allergies and special dietary information (vegan, vegetarian etc).

Identify the entities, attributes and relationships that exist in the above scenario. For the moment, focus on storing the client and group information, along with the information supplied when a booking occurs. Seminar, activity and detailed information about diets and foods can be ignored for the moment.

You will have to make some assumptions or deductions about the information to be stored, which will be fine as long as they are sensible. Make sure you state any assumptions you have made.

Show this information in a data dictionary.

Task Two

Using the data dictionary you created in Task One, create a UML diagram that models the entities and attributes you've selected.

You should use the UML class diagram style (you can leave the third part of each class box blank as we will assume that you are developing for a relational model implementation).

You should name each entity (class in UML) and show the attributes clearly - Label the relationships and add valid multiplicities

Next: Create SQL statements that create the entities, attributes and relationships you've modelled above and run them in Access to check that the table structure are valid. Whilst doing this you will probably have to go back to the original UML diagram to sort out Keys, Foreign Keys or attributes on relationships which

you've suddenly spotted. Make up 3 or 4 records of sample data to ensure that its valid.

If you're feeling brave, you could try your hand at one of the UML tools out there (such as argo UML), however, the interfaces can be messy.

Task Three

Task Three is the final activity and is in two parts – the first requires modelling the entities and relationships required to monitor calorific expenditure that occurs when exercise is taken. The second part requires connecting this model to that of people staying at the centre during their stay.

Part One

The activity centre keeps track of the exercises / classes that people elect to take during their stay. Model the information on the next page using UML class diagrams. You should ensure that it integrates with your work in Task One and Two.

Once the design is satisfactory, implement the design in your database – include sample records from the data shown in the tables.

You should be able to answer questions such as:-

- What activities did a person do in a day?
- What activities did they take part in during their stay?
- What calorific output did they achieve in these activities?

Include SQL and screen shots of the results for your sample data.

People use up energy both through undertaking specific activities and through the body's metabolic rate. One estimate suggests that about half our energy is needed just to survive. This is the basal metabolic rate. The other half is used up through work and leisure activities. Energy is measured in terms of kilocalories (kcal) or kilojoules (kJ). In everyday language these are referred to as 'calories' and 'joules' respectively. The daily expenditure of energy for various occupations and various activities are shown in Figure 2.

Average daily calorific requirements by age and occupational category

Age range	Occupational category	Calories	Joules
Men			
18 up to 35 years	Sedentary	2700	11297
	Moderately active	3000	12552
	Very active	3600	15062
35 up to 65 years	Sedentary	2600	10878
	Moderately active	2900	12134
	Very active	3600	15062
65 up to 75 years	Sedentary	2350	9832
75 and over	Sedentary	2100	8786
Women			
18 up to 55 years	Most occupations	2200	9205
	Very active	2500	10460
55 up to 75 years	Sedentary	2050	8577
	Sedentary	1900	7950
Pregnancy, 1-9 months		2400	10042
Breast feeding		2700	11297

Average daily calorific requirements by age

Age range	Calories	Joules	Age range	Calories	Joules
Schoolboys			Boys and Girls		
9 up to 12 years	2500	10460	0 up to 1 year	800	3347
12 up to 15 years	2800	11715	1 up to 2 years	1200	5021
15 up to 18 years	3000	12552	2 up to 3 years	1400	5858
Schoolgirls			3 up to 5 years	1600	6694
9 up to 12 years	2300	9623	5 up to 7 years	1800	7531
12 up to 15 years	2300	9623	7 up to 9 years	2100	8786
15 up to 18 years	2300	9623			

Average hourly calorific requirements by activity

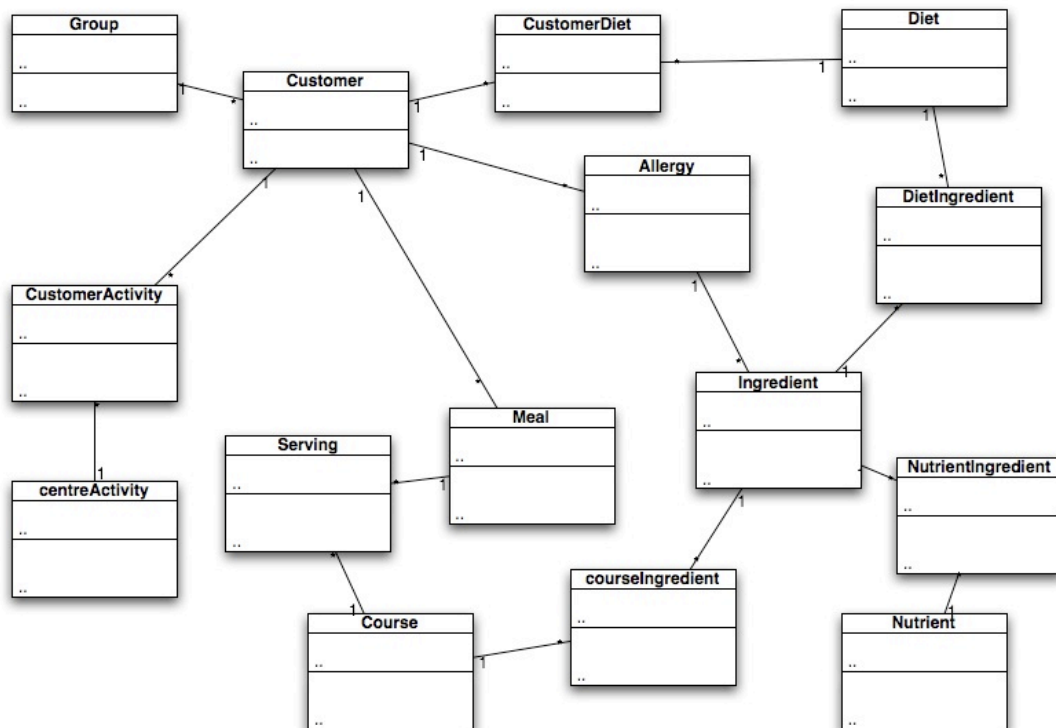
Activity	Women	Men
Bowling	207	270
Cycling (moderate)	192	256
Cycling (hard)	507	660
Domestic work	153	200
Driving	108	144
Eating	84	112
Gardening (active)	276	368
Office work (active)	144	192
Running (moderate)	444	592
Running (hard)	692	900
Sitting	84	112
Swimming (moderate)	230	300
Swimming (hard)	480	640
Walking (moderate)	168	224

Figure 2 Energy expended through some occupations and activity

Part Two

The following pages loosely describe the calorific intake that occurs when people consume certain foodstuffs and meals.

Model this information, so that the organisation can determine the calorific intake from the food items ordered during each customers stay. The following sample solution may help with the linkage between the entities (and the entities required). You will have to determine the attributes and keys. The following classes structure (which previous students have used) may help:



A few sample dishes are included which may be used as the source for example menus (which would then lead to ingredients and amounts being stored).

Implement the model in the database and include enough sample data to demonstrate the following queries:-

- For a customer, show the menu items they ordered on a particular day
- For a particular meal, show the calorific intake (you may have to make assumptions or generalisations to get this working)

Show these queries working (include the SQL and the result).

<i>Food</i>	<i>Calories per oz</i>	<i>Food</i>	<i>Calories per oz</i>
FISH (PREPARED)		CEREALS AND CEREAL PRODUCTS	
Cod (steamed)	23	All-Bran	88
Crab	36	Arrowroot	101
Haddock 28		Pearl barley, cooked	34
Kippers	57	Bread, Hovis	67
Lemon Sole	26	mult	71
Lobster	34	Cornflakes	104
Mackerel 53		Cornflour	100
Oysters	14	Flour	95
Plaice	26	Oatmeal, porridge	13
Prawns	30	Puffed wheat	102
Salmon, canned	39	Rice, polished	35
fresh	57	Ryvita	98
Sardines, canned	84	Shredded Wheat	103
Shrimps	32	Spaghetti	104
Sole	24	Westabix	100
SUGARS, PRESERVES		DRINKS	
Chocolate, milk	167	Bovril	23
plain	155	Cocoa	128
Chutney, tomato	43	Lemonade	6
Honey	87	Marmite	2
Ice cream	56	Tea (Infusion)	1
Jam	74	Coffee (Infusion)	1
Jelly, packet	73	ALCOHOLIC DRINKS	
Marmalade	74	Beer, bitter	9
Mars Bar	127	mild	7
Sugar, demerara	112	Stout	10
white	112	Strong ale	21
MILK AND MILK PRODUCTS		Cider, dry	10
Butter	226	sweet	12
Cheese, Cheddar	120	vintage	28
Blue	103	Port	45
Cottage	33	Sherry, dry	33
Cream, double		sweet	38
single	62	Champagne	21
Milk, whole	19	Graves	21
skimmed	10	Sauternes	26
Yoghurt, low-fat	15	Burgundy	20
Eggs	46	Beaujolais	19
Margarine		Chianti	18
Lard	262	Spirits	63
Oil	264		

Figure 3 Calorific content of some foods

Some people have specific dietary requirements. For example, some people are allergic to wheat, others are allergic to chocolate and others to milk or dairy products in general. Doctors may prescribe special diets in order to lower cholesterol or because of some illness. Others may choose to have a special diet. For example, vegetarians eat no meat and vegans also avoid dairy products. Some people will avoid fish or very fatty foods such as cream. These diets need to be considered when providing food. Figure 4 gives some sample special diets.

Low-fat diet

Avoid the following

Fried or braised food. Fat meat, duck, pork sausages.
Herrings, kippers, sardines and salmon.
Whole milk, cream, ice cream, cheese, egg yolk, butter,
margarine, cooking fat and oil, suet.
Pastry, biscuits, cakes containing fat.
Mayonnaise, salad dressings, chocolate, coffee, nuts and olives.
Mince and lemon curd.
Cream soups and sauces.
Drinking chocolate, cocoa.

Low-salt diet

Avoid the following

Bacon, ham, sausages, canned meats, bought cooked meats,
meat pasties.
Kippers and other smoked fish.
Rollmops.
Fish fingers.
Canned foods (except fruit).
Breakfast cereals, bought biscuits and cakes.
Any cakes containing baking powder or soda.
Cheese, salted butter and margarine, ice cream.
Sauces, chutneys, tomato paste.
Golden syrup, treacle, chocolate, toffees.
Packet mixes.
All powders used for making milk drinks.
Dried fruit except prunes.
Meat and yeast extracts.
Beer.

Vegetarian Diet

Avoid the following

All meat.

Vegan Diet

Avoid the following

All meat.

Dairy products.

Cholesterol lowering diet

Avoid the following

All dairy and animal fats.
All offal and shell fish.
Full cream milk (use skimmed) and dairy ice cream.
Cheese other than cottage cheese.
Gravies, rich sauces and cream soups.
Baked foods prepared with egg yolk, butter or whole milk.

Don't eat more than 3 egg yolks a week. Use polyunsaturated fats for all cooking purposes.

Figure 4 Some different diets

As a general rule of thumb, if a person consumes more calories than he or she expends weight will be gained and if a person consumes less, weight will be lost. By comparing the calorific intake with the estimated calorific expenditure for an individual, it is possible to estimate whether weight will be gained or lost. By monitoring this against actual weight gained/lost it is possible to build up a more detailed picture of the individual's calorie requirements. However, it must be stressed that this is just a rule of thumb. Individuals do vary in the rate at which they use up energy. It is also vital to maintain a balance between the different types of foodstuff (Figure 1). Processed and other 'convenience' foods often contain more calories than basic foods. Figure 3 lists the calorific content of some foods, but there can be a large variation between brands.

Calorie content of foods

Food	Calories per oz	Food	Calories per oz
FRUIT		Chicory	3
Apples	13	Cucumber	3
Bananas	22	Leeks, raw	9
Blackberries	8	cooked	7
Grapes, black	17	Lentils	27
white	18	Lettuce	3
Grapefruit	6	Marrow	2
Lemons	4	Mushrooms	2
Melons	7	Onions	4
Oranges	10	Parsley	6
Peaches	11	Parsnips	16
Pears	12	Peas, raw	18
Plums	11	boiled	14
Raisins	70	dried	28
Raspberries	7	cooked	23
Rhubarb	1	Potatoes, old	21
Strawberries	7	new	68
Sultanas	71	chips	159
Tangerine	10	crisps	7
		Spinach	3
NUTS		Spring greens	5
Almonds	170	Swedes	4
Brazils	183	Tomatoes	3
Chestnuts	49	Turnips	4
Coconut, desiccated	178	Watercress	
Peanuts	171		
Walnuts	156	MEAT, POULTRY (COOKED)	
		Bacon, back (fried)	169
VEGETABLES		Beef (lean and fat)	
Artichokes	4	topside,	91
Asparagus	5	roast	109
Beans, broad	12	sirloin, roast	86
butter	26	silverside	66
French	2	corned	54
haricot	25	Chicken, roast	89
runner	2	Duck, roast	123
Bectroot	13	Ham, boiled	45
Broccoli	4	Kidney	81
Brussels sprouts	5	Liver, ox (fried)	36
Cabbage, raw	7	Lamb, chop, grilled	83
cooked	2	leg, roast	90
Carrots, raw	6	Pork leg, roast	81
cooked	5	Sausages, fried	81
Cauliflower	3	black	56
Celery, raw	3	Turkey, roast	66
cooked	1	Veal, roast	

Fried aubergines with parsley

(serves 4)
aubergines – 700 g (1½ lb)
salt and freshly ground pepper
flour, optional
50–75 ml (4–5 tbs) cooking oil
50 g (2 oz) butter
small clove garlic, skinned and crushed
50 ml (2 tbs) chopped parsley

100 Cauliflower au gratin ✓

(serves 4)
1 cauliflower, trimmed ✓
40 g (1½ oz) butter ✓
45 ml (3 level tbs) flour ✓
300 ml (½ pt) milk ✓
100 g (4 oz) cheese, grated ✓
salt and pepper ✓

Mullet in tomato sauce

(serves 4)
4 red mullet, whole and cleaned
30 ml (2 level tbs) seasoned flour
oil or butter for frying
30 ml (2 tbs) fresh white breadcrumbs
15 ml (1 tbs) chopped parsley
For the sauce
½ onion, skinned and finely chopped
1 clove garlic, skinned and crushed, optional
25 g (1 oz) butter
450 g (1 lb) tomatoes, skinned and quartered
salt and pepper
10 ml (2 level tsp) sugar
1 bayleaf

Whole green lentils

(serves 4)
4 tablespoons vegetable oil
½ teaspoon whole cumin seeds
4 cloves of garlic, finely chopped
75 g (3 oz) onion, peeled and chopped
200 g (7 oz) whole green lentils
720 ml (1¼ pints) water

102 Normandy pork

(serves 4)
77 900 g (2 lb) fillet of pork ✓
55 30 ml (2 level tbs) seasoned flour ✓
40 300 ml (½ pt) dry white wine ✓
41 225 g (½ lb) button mushrooms, sliced ✓
54 40 g (1½ oz) butter ✓
42 30 ml (2 tbs) brandy ✓
43 30 ml (2 tbs) chopped parsley ✓
44 142 ml (¼ pt) double cream ✓
salt and pepper

Pasta niçoise

(serves 2)
100 g (4 oz) twisted pasta
2 firm tomatoes
2 eggs, hard boiled
113 g (4 oz) can tuna fish, drained
½ red pepper, seeded and finely sliced
50 g (2 oz) French beans, cooked
8 black olives
few capers
45 ml (3 tbs) garlic flavoured French dressing

103 Tortilla (potato omelette) ✓

(serves 4)
45 300 ml (½ pt) oil ✓
46 450 g (1 lb) old potatoes, peeled and sliced ✓
47 ½ onion, skinned and chopped ✓
48 4 eggs ✓
salt and freshly ground pepper

Stuffed peppers

(serves 4)
4 green peppers, halved lengthways and seeded
1 onion, skinned and chopped
100 g (4 oz) bacon, chopped
40 g (1½ oz) butter
4 tomatoes, skinned and sliced
100 g (4 oz) long grain rice, boiled
salt and pepper
60 ml (4 tbs) grated cheddar cheese
50 g (2 oz) fresh breadcrumbs
150 ml (¼ pt) stock

Figure 6 Sample dishes and menus

Proteins

Proteins are required for growth, the formation of new tissues and the repair and maintenance of the old tissues. They also supply heat and energy.

Sources

Meat, fish, poultry, milk, cheese, eggs, pulses, bread, cereals and nuts.

Fats and oils

These form a fundamental part of all cell structures, provide a concentrated form of energy, and act as carriers for vitamins A, D, E and K.

Sources

Butter, margarine, lard, dripping, vegetable fats and oils, fish oils, meats (especially pork and bacon), cream, cream cheese, eggs.

Carbohydrates

These provide heat and energy for muscular contraction.

Sources

Sugars and starches. Since 50–60% of the total caloric intake is supplied by carbohydrates, care should be taken to ensure that the carbohydrate foods taken also contribute other nutrients, eg wholemeal flours and breads, whole-grain cereals, pulses, nuts, potatoes.

Use the following with discretion: white flours, polished rice, puffed or flaked cereals, sugar, jams, biscuits, cakes and pastries.

Minerals

These are necessary for the formation of body structure and for normal body functions. They are widely distributed in foods.

Sources

Calcium Milk, cheese, eggs, green and root vegetables, fortified white flour and bread.

Phosphorus Fish, cheese, milk, eggs, meat, green vegetables, cereals.

Iron Liver, kidney, eggs, whole-grain cereals, heart, meat, fish, pulses, green vegetables and potatoes.

Sodium Salt.

Vitamins

Vitamins are substances required in small amounts in food to promote the normal health of the body. They can normally be obtained in a good diet of natural foods.

Vitamin A keeps the mucous membranes healthy, also the skin, glands and bones, and is necessary for normal growth and development and for properly functioning eyesight.

Sources

Liver, butter, margarine, eggs, milk, cheese, carrots, spinach and other green vegetables, tomatoes, watercress, dried apricots and prunes, cod liver oil and halibut liver oil.

Vitamin B (that is the vitamin B complex, including vitamins B₁, B₂, etc.) is necessary for the good condition of the nervous system, for normal appetite and digestion and for other processes.

Sources

Yeast and yeast extracts, whole-grain cereals, wheat-grain cereals and wheat-grain preparations, liver and other offal, lean meat, pork (including ham and bacon), fish, egg yolk, milk, cheese, vegetables, nuts and fruit.

All flour must now by law contain certain quantities of vitamin B₁ and niacin (another constituent of the vitamin B complex).

Vitamin C increases resistance to infection and maintains a healthy condition of the skin (in a deficiency of this vitamin, wounds are slow to heal); it improves the circulation and the condition of the gums and other body tissues. It is found in fresh vegetables and fruits, but the distribution is uneven.

Good sources

Rose-hip berries (as syrup), blackcurrants, Chinese gooseberries, citrus fruits and juices. Fresh vegetables are a valuable source, provided correct cooking methods are followed.

Vitamin D ensures the proper utilization of calcium and phosphorus, directly influencing the structure of bones and teeth.

Sources

Fish liver oils, oily fish, egg yolk, butter, vitamin-enriched margarine. This vitamin can also be manufactured in the body by the action of sunlight and ultra-violet light on the skin surface.

Figure 1 Nutrients in types of food

2.2 Planning menus¹

Most people have reasonably regular eating habits and with any group of people staying together, or with a typical cross-section of the public, it is usually possible to estimate the quantities and types of food which will be consumed each week. However, even the most interesting foods can become tiresome if they are served up with too much regularity. Seasonal variation in the cost and availability of certain foods also introduces uncertainty on the organization of menus. Individual whims and the occurrence of different activities during the week can make planning difficult.

When planning the quantity of food which is required for a meal, the list in Figure 5 can be used as a guide. This shows the estimated quantities for a person. In the case of vegetables, the quantities should be varied accordingly if the meal includes more than one vegetable. Of course these figures can be altered in order to deal with individual needs, and should be adjusted for different numbers of people. Some example menus and meals are shown in Figure 6.

Amounts to buy per person

Meat	100–175 g (4 oz) boneless 225–350 g (6 oz) with bone
Chicken	350 g (10 oz)
Fish	175–225 g (6–8 oz)
Beans	350 g (6oz)
Carrots	225–450 g (8 oz)
Celery	half a head
Mushrooms	225 g (4 oz)
Peas in the pod	700 g (12 oz)
Potatoes	450 g (8 oz)
Courgettes	350–450 g (6 oz)
Tomatoes	225–450 g (6 oz)
Broccoli	350–450 g (6 oz)
Sprouts	350–450 g (6 oz)
Cabbage	350–450 g (6 oz)
Cauliflower	700 g (12 oz)
Breads	100–175 g (6 oz)
Pasta	100–125 g (6 oz)
Pulses	100–175 g (6 oz)
Rice	100–175 g (6 oz)
Cereals	100–175 g (6 oz)

Figure 5 Estimates of food for a meal

¹ This advice is based on information in *The Good Housekeeping Cookbook* (Ebury Press). It is intended to be illustrative of the sort of information which is relevant; we take no responsibility for its accuracy!

What you are required to hand in

You should hand in a business style report with the appropriate report structure (contents, page numbers, consistent structure and styling).

It should include the following:

- Data Dictionaries
- UML diagrams or ER diagrams, from a tool or hand drawn
- Table structures with attribute descriptions
- Any interface elements that aid the explanation (forms)
- All code (if producing using PHP/MySQL)
- Examples of data
- Sample Queries

Explanations and examples should be used with the elements in the report (you can write this for a reader who is familiar with database management and production, so very long simple explanations are not required).

Notes on how to correctly structure the document can be found at <http://bit.ly/gJ0tNr>