## Task 2: database design and development (part A)

West Fife Walkers organise walks around the woodlands of West Fife. It wants to keep a record of their walkers, the different routes available and who has taken part on each walk. Each route has been designed by a route planner.

West Fife Walkers wants to create a database to store:

- details of all walkers including their name, address, and contact number
- details of route planners including their name, contact number and year of registration
- details of each route including a general description, its level of difficulty, suitable footwear, the name of the woodland and the distance of the route
- details of walks, including the route walked, which walkers took part and the date the walk took place

Functional requirements for the database:

- display suitable footwear for a chosen route
- display a list of walkers who prefer to walk a route with a chosen level of difficulty
- display a list of walkers who have walked the longest route
- find the travelling distance from a walker's home to the starting point of a chosen route
- count the number of route planners registered in a given year
- display the total number of walkers who have walked a route designed by each route planner

**2a** The following tables have sample data that shows:

- walkers and the walks they have completed
- each time a route has been walked
- the planner who designed each route

| Walker | Walk |
|---|---|
| Walker1 | Walk1 |
| Walker2 | Walk2 |
| Walker1 | Walk3 |
| Walker2 | Walk4 |
| Walker3 | Walk5 |
| Walker4 | Walk6 |

| Walk | Route |
|---|---|
| Walk1 | Route1 |
| Walk2 | Route1 |
| Walk3 | Route2 |
| Walk4 | Route3 |
| Walk5 | Route4 |
| Walk6 | Route4 |

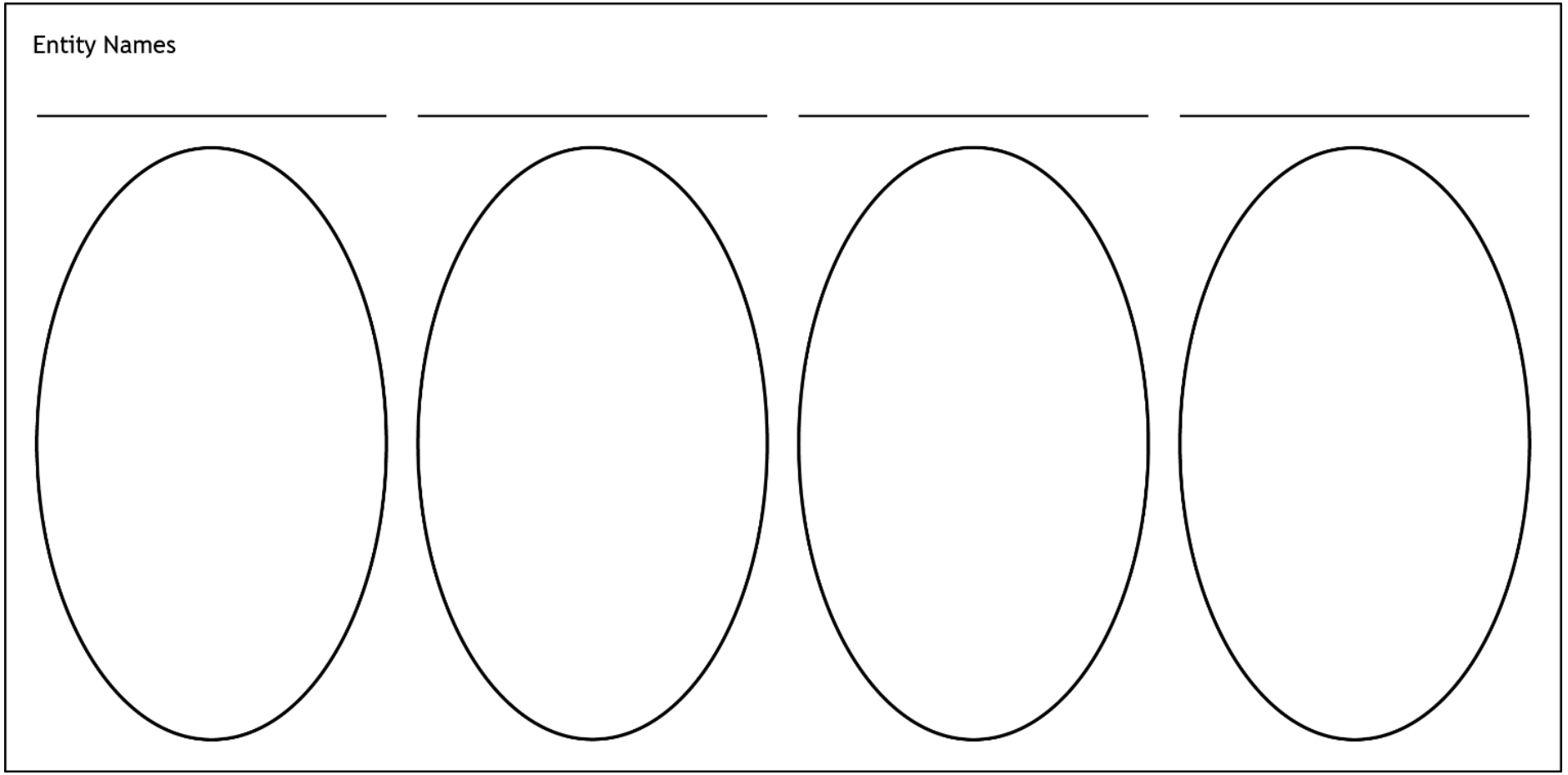
| Route | Planner |
|---|---|
| Route1 | Planner3 |
| Route2 | Planner2 |
| Route3 | Planner1 |
| Route4 | Planner3 |

Using the information from the sample data, complete the blank entity-occurrence diagram on the following page by:

- naming the entities
- completing the sample instances provided for each entity
- showing the association between those instances

**(3 marks)**

**Entity-occurrence diagram**

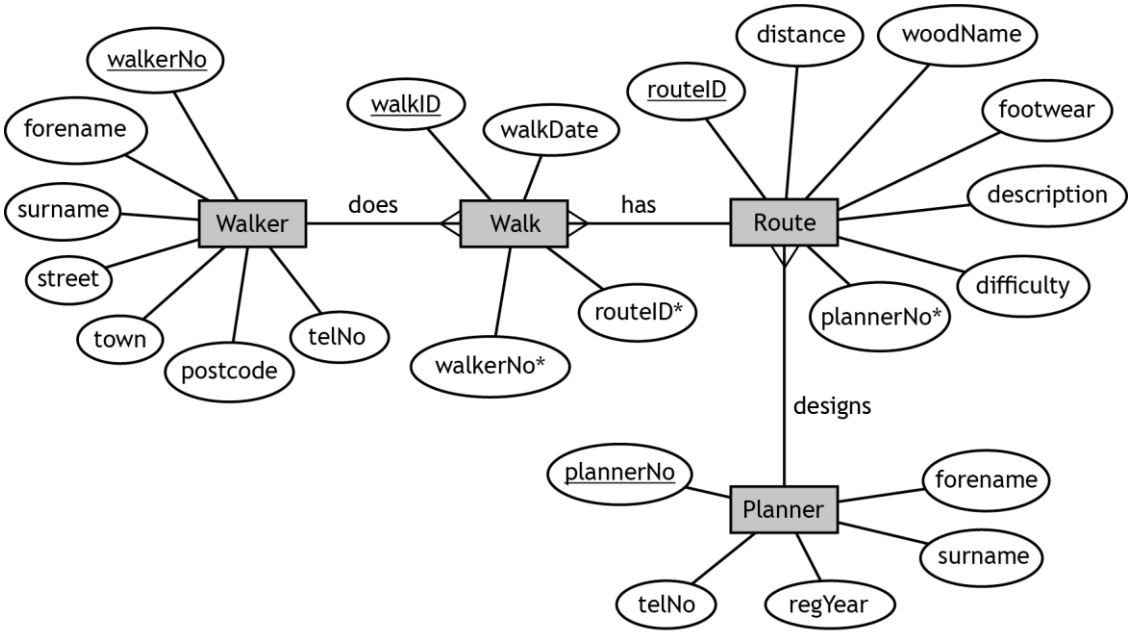



- Check your answers carefully, as you cannot return part A after you hand it in.
- When you are ready, hand part A to your teacher or lecturer and collect part B.

Candidate name_____ Candidate number_____

## Task 2: database design and development (part B)

The entity-occurrence diagram is used to draw the entity-relationship diagram for the Walkers database shown below.




The design is then implemented.

Your teacher or lecturer will provide you with a completed and populated database file.

**2b** West Fife Walkers wants the most successful planner to design a new route. The most successful planner is the person whose route(s) have been walked more than other routes.

A query is required to display details of the four planners, along with the total number of times their route(s) have been walked. The most successful planner should be displayed at the top.

Implement the SQL statement to produce the following output.

**(4 marks)**

| forename | surname | plannerNo | Total participants |
|---|---|---|---|
| Heidi | Benton | 101 | 273 |
| Selena | Booker | 103 | 260 |
| Daniel | Little | 104 | 169 |
| Takeshi | Chen | 102 | 103 |

Print evidence of the implemented SQL statement and the output produced.

Include your name and candidate number on all evidence.

**2c** The most successful planner begins to design the new route. As this route will be longer than the current longest route, West Fife Walkers would like to produce a list of all walkers who have walked the current longest route to ask them questions.

Implement the SQL statement(s) required to produce the list. The expected output is partially shown below.

**(5 marks)**

| walkerNo | forename | surname | telNo |
|---|---|---|---|
| 162000 | Nancy | Burch | 07820 622714 |
| 165692 | Lola | Kent | 07533 447224 |
| 167407 | Lelia | Mercado | 07740 567706 |
| 167549 | Jayne | Mcneil | 07758 443003 |
| 169193 | Ofelia | Nash | 07796 861247 |
| 191025 | Trina | Hinton | 07677 367751 |
| 192174 | Lorena | Boyle | 07142 881757 |
| … | … | … | … |

Print evidence of the implemented SQL statement(s) and the output produced.

Include your name and candidate number on all evidence.

**2d** The footwear field in the Route table contains suitable footwear for the routes:

- Trail shoes
- Walking boots
- Waterproof shoes
- Boots (high ankle)
- Boots (robust, waterproof)
- Walking shoes

A query is designed to find all the routes that are suitable for any type of shoe.

The SQL statement shown below was implemented and tested.

```
SELECT Route.routeID, woodName, description
FROM Route
WHERE footwear = "Trail shoes"
OR footwear = "Waterproof shoes"
OR footwear = "Walking shoes";
```

The actual output from this SQL statement matches the expected output and is shown below.

| routeID | woodName | Description |
|---|---|---|
| Dea002 | Dean Wood | The forestry road is an easy stroll with open views of the surrounding area and its wildlife. The other half of the walk takes you through woodland down into the valley. |
| Dev002 | Devilla | This walk completes the circuit round the end of the squirrel walk passing seats and nice picnic areas. On the way back a connecting path is taken to join one of the forestry roads. |
| Bal001 | Balgownie | The Balgownie side of the walk is a mixture of open forestry road and woodland paths. The eastern edge has a well-established path through a community wood. |

West Fife Walkers will add new routes to the database in the future. These new routes may include additional types of shoes.

Re-write the query so that it will always produce the expected output even if additional types of shoes are added.

Test that your amended query still produces the above output.

**(2 marks)**

Print evidence of the amended SQL statement and the output produced.

Include your name and candidate number on all evidence.

**2e** Initial analysis identified the following functional requirements:

- display suitable footwear for a chosen route
- display walkers who prefer to walk a route with a chosen level of difficulty
- display a list of walkers who have walked the longest route
- find the travelling distance from a walker's home to the starting point of a chosen route
- count number of route planners registered in a given year
- display the total number of walkers who have walked a route designed by each route planner

State the functional requirement that cannot be implemented using the West Fife Walker's database.

**(1 mark)**

Candidate name_____ Candidate number_____