Shop

Kiosk

(2 staff)

The stars represent the safari manager order for the one-way system.

4

Kiosk

2 staff

Dinosaur World

**Capacity 300** groups and takes 10 minutes to walk through it

Exit from Theme park

3

Restaurant

2

1

Playground can fit **500 groups** **(capacity)** in at any time and it has picnic spaces too. Visitors spend between 30 minutes and 60 minutes here

African animals Village Trail’ capacity is **500 groups** and people spend 20 minutes walking through this

Shop

Penguin Cove

**Capacity 100** groups and groups take about 10 minutes watching them.

Entry to Theme park

Safari Theme park square

With restaurant and playground

# Case Study: The Exillirous Safari modelling exercise

## The problem

Exillirious Safari is a very famous attraction in the UK entertaining families and adults for over 50 years. The main park visitors are families with children. Visitors are admitted daily from 9am-5pm. Last entry to the park currently is set to 4pm currently. (put a fixed distribution which stops people coming at 4pm) The safari park manager is keen to explore their trade on the weekend and reports that Saturdays are the same as Sundays.

Table 1 The data on weekend (e.g. Saturday) arrivals provided by the Safari park manager, based on her best guess and the numbers are approximate

|  |  |  |  |
| --- | --- | --- | --- |
| Arrivals of different groups: | Between 9am and 11am | Between 11am and 2pm | Between 2pm and 4pm |
| Families (parents with children in any combination) | 300 arrivals in this period | 120 arrivals in this period | 40 arrivals in this period |
| Couples | 200 arrivals in this period | 100 arrivals in this period | 5 arrivals in this period |
| Friends (groups of four people) | 100 arrivals in this period | 50 arrivals in this period | 30 arrivals in this period |

The safari park manager is particularly concerned about the visitors experience at the park and does not want them to feel like they are spending their day queuing so will go out of her way to avoid those scenarios. **Customers should not spend more than 10 minutes queuing for any attraction.** **Numbers are also expected to increase in the summer 2023.**

The park has recently undergone some updating to its facilities and the expected opening date is the 10th of May 2023. The management team is considering how many visitors they should allow into the park **daily** and **whether they should make any changes to their operating times or outlets.**

## More information about Exhilirious Safari

Exhillirous Safari is an open-air entertainment park. Tickets are typically purchased online and on mobile apps and the car registration is scanned on entry to allow free parking. It has a large car park with fields nearby to accommodate overflowing parking with extensive capacity.

It holds over 200 species of exotic animals, taking care of the largest groups of white lions, cheetahs, hippopotami, and meerkats in the world. The park is dedicated to the conservation of animals. Amongst other staff it employs five full-time researchers (animal biologists) and does a great deal of work in species conservation.

The park has a path to guide visitors through a one-way system to each attraction, so customers generally only visit each attraction once. The safari park manager provided you with a map of the theme park which is usually given to visitors. Attractions at the Theme Park include the African animals village trail (e.g. caged animals); the penguin cove; the dinosaur world; and a playground (which provides a lot of seating for those with picnics even if they are not families). These are available to all visitors depending on their preferences. Most visitors go to all the main attractions if they have the time by following the one-way system.

The park facilities include two shops (one at the entrance and one at the exit) selling souvenirs and products suitable for visitors to purchase, 1 theme park restaurant, 2 kiosks selling ice cream, drinks, and sweets.

Table 2 The data provided by the Safari Park manager, based on her best guess and the numbers are approximate.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Gift shop use (open all day) | Restaurant **(open between 11am-3pm)** | Kiosks (Open all day) |
| Visitors | 50% use the gift shop at the entrance point. However, if they have used the initial gift shop, they will not use the exit one. The rest tend to use the exit one. **They spend around 2 minutes paying.(**This can change depending on type of grp. For ex, Families could spend more time.) | **20% of visitors** use it. Others bring food with them to have a picnic. They typically will spend between **20 and 40 minute**s eating at the restaurant.  **(No extra eating activity)** | **99% of visitors** will purchase something from any of the kiosks at least once during their visit. They spend **5 minutes on average** choosing and paying. |
| Other information | **The gift shops have 4 tills** each at the checkout point currently. The size of the stores is large. Browsing in the store is usually only about 5 minutes. | The restaurant can cope with **100 groups**. Tables need to be cleaned in between groups and it **takes 5 minutes to clear these.** | The theme park is spacious and people often stand near the kiosks in the open air to consume food **(doesn’t take more than 10 minutes)** and drinks purchased at the kiosk. There is plenty of space and unlimited capacity here. |

There are plenty of toilet block and sanitation facilities.

## Your task

Consider the information provided and decide which parts you will include in your simulation. As part of this assignment you will: develop a Conceptual Model; develop a baseline computer model (the current situation); undertake Validation and Verification (and/or report what you would be doing here ideally); Undertake Calibration; Undertake experimentation (report baseline findings and report on scenarios). MSc students will be uploading a simul8 model and a technical report to Moodle May 10th 2023 by 2pm. There are no extensions possible beyond this date (you would need to go through a formal KBS process not managed by me and provide evidence). HDAs will be given an alternative submission deadline discussed in the seminar.

You are allowed to discuss the model development with people on your course but you must develop the baseline model (current scenario) independently. Each student will be submitting a technical report and a baseline model.

Notes to consider:

**Communication and presentation of the technical report (20% of the marks): The marks are awarded for** good communication, sensible structure (e.g. good headings good internal structure with introduction and conclusion and with sensible content in paragraphs) and professional presentation (e.g. have you put captions for your tables/diagrams; are you citing tables/appendix in your main doc?) and adhering to the guidelines set in this brief. You will need to report on your work in the form of a 2,500 word technical report (do not exceed the word count). This will be a maximum of 14 pages that should include a cover sheet; main body and appendix. There is no need to provide an executive summary. The main body should be Calibri font and paragraphs spaced 1.5 with normal margins. You are encouraged to use the appendix as much as possible for tables and diagrams.

**Conceptual Model (10% of the marks):** Consider the issues that the management team/the safari manager are facing and develop a conceptual model to include objectives, inputs (experimental factors) & outputs (Key performance indicators), model contents, assumptions and simplifications and to provide a communicative model (i.e. diagram) of your simulation model.

**Model coding the baseline model (40% marks):** Please upload this Simul8 model to Moodle. Tip: Ask yourself if you have produced a functional model that has sensibly interpreted information in the brief using labels, time dependent distributions. Have you included documentation on the model itself? Have you put some animation? The results of the baseline model should be reported with the scenarios. This section should be about the functionality of the computer model highlighting what could/could not be modelled.

**Validation and verification and calibration (10% of the marks).** Here you should report the run time of your model; if you need to deal with initialisation bias; multiple runs; and how you have or would address any V&V issues.

**Experimentation (20% of the marks):** The safari park manager would like you to report if she needs to make changes to the safari based on the baseline model results. A maximum of 3 further scenarios should be reported with one considering structural changes (not just changing numbers). Can she provide a great experience to visitors if numbers increase? Will she need to hire additional resources? This section of the technical report should not only communicate the scenarios but demonstrate that you were able to model the different scenarios in simul8.

Any question you have need to be asked here [CB966 Assessment (padlet.com)](https://padlet.com/kkotiadis/xsv0wgm5ajcayv70). Please do not email me privately so that all the class can see the questions and answers and avoid duplication of answers.

Good luck

The safari park manager