Assessment Task 3 – Individual Assignment

This is an individual task. It accounts for 30% of your total mark.
Ongoing submissions (via course site) from Week 1 to Week 11.

Purpose

This assignment assesses your ability to calculate and interpret data (analytical skills) plus how this may feed into management plans or strategies (interpretation of analytical results). Take carful note of the marks allocated for each part as a guide to the effort required to provide a sufficient answer that part.

Task

It is Question – Answer style assignment. You are expected to supply a professional report as would be expected in the workplace. A 10% penalty (reducing the overall mark) will be applied where answers are difficult to access or identify due to poor presentation related to either stylistic or technical reasons.

Instructions

- Choose to answer any two questions (from a choice of five).
- Word limit. 500-700 words for each question.
- Format is open – you may submit using MS Excel (preferred), MS Word, – or use both (or other similar software).
- Each question contributes 15% towards assessment.
- Submit online at the course site.
- Multiple files are allowed (e.g., MS Excel file and MS Word file). It is recommended that you use MS Excel exclusively—though take care to make the final answer to each part obvious to the marker.
- Mark clearly the question and part attempted
- Include your name and student ID in the name of the files as well as in the first page of the files, e.g. Jane Citizen 20212021.
- Pay attention to the weight of parts within questions.
- Penalty will apply for late submission: 10% of the marks for this task for each delay in submission of a day (weekend included).

Question 1

The Endless Point Rest is a popular and friendly family coastal resort. The resort consists of 122 self contained family style units and 24 hour reception. The pricing policy follows a fixed low rack rate; the same price on every room. This strategy keeps the guest rolling in and makes the resort the envy of other local accommodation providers as these establishments are rarely more than half full. The friendly owners of Endless Point Rest, known as Ma and Pa, have a policy of not charging *no shows*. As Ma says "if they can't come then we got no right to take away their hard earned money and anyway, we want to see them next time."

Just today, Ma and Pa's son Emmet has returned home after completing his business degree. He sits Ma and Pa down.

"Ma and Pa, we don't have to be losing money – we're fully booked every night of the year – and don't you see that a no show means the room is lost?" Emmet's eyes light up. "I can do some calculations and work out a plan – but we need to overbook!"

"I don't know Emmet" says Pa, "we still got the room for the next night but I can't build another one in just a few hours if too many families show up. And that old tent with holes we used to use for emergencies just *aint* so popular anymore. "

"Leave that to me" replies Emmet.

Emmet's research has profiled *no shows* based on a year (365 days) of records:

Booking no shows (# rooms)	Nights
0	20
1	53
2	65
3	74
4	49
5	36
6	23
7	15
8	11
9	7
10	6
11	4
12	2

Emmet has estimates that every no show is a loss if $73 per room per night. So he makes a deal with Billy-Bob, the manager of Lucky Zest resort. "Billy-Bob, take our *walks* and we'll pay the charge. I know your rack rate is $230 a night – what about we pay you $90 a room per night for getting our free business? We'll never walk more than 12 to you any one night."

Billy-Bob knows a good deal when he hears it. "Ok, covers our variable costs easy – and we always got rooms - you've got a contract."

Emmet knows the loss from a *walk* is more than just paying the cost of Billy-Bob's resort room. Even though the walked customer will have already paid The Endless Point Rest $97 (for the unavailable room), Emmet estimates the additional cost (loss of good will, loss of additional services) to be $110 per walked guest.

Tasks: (Total 100 marks)

1. Calculate the expected opportunity loss per night sustained by The Endless Point Rest.
(15 marks)

2. Calculate the number of rooms to be overbooked by The Endless Point Rest to minimise the expected loss in the long run (maximum 12 no shows and assume guest length of stay is one night). What is the expected average gain per night from overbooking? Show all workings.
(30 marks)

3. Apply the critical fractile criterion decision rule to verify your answer to task 2. Does this confirm or contradict the result for Part 2? Why is this? Explain in plain English what the critical fractile actually indicates with regard to its interpretation. (15 marks)

4. Prepare a 50 word (maximum) *script* to be used by staff when walking a family (i.e., how staff explain to disgruntled families a room is not available). What other measures may be used or implemented by the Endless Point Rest to support this overbooking strategy?
(40 marks)

Question 2

The *Lets-Do-A-Deal* new car sales dealership needs to review and plan its services. It's a very busy dealership with an easy to access location. A new car sale is made on average to every second walk in customer. Sales staff work mostly on a commission basis (there's also a small retainer). Sitting in the glass panelled office, the sales team keep an eye on the lot and take the walk-up customers in turn.

But good sales staff need a guarantee of regular opportunities and don't wish to be waiting around too long for new *targets* (i.e., potential new car buyers). Helen, the dealership proprietor, suspects that some of the better salespeople have left in the last few years due to this issue. She's tried various sales team numbers (from two to seven) but has just three now as the team resists employing new team members arguing this reduces their own chance to make a sale. And anyway, the sales staff get edgy if they have to sit around for more that 15 minutes waiting for their next *target*. Helen feels conflicted by taking on more sales staff but her specified (and advertised) service standard is that all customers will be greeted on arrival – she feels that a failure here reduces customer trust and so results in a lost sale about half the time.

Helen's wondering whether there may be a way to get a better *handle* on the pattern of potential new car buyers entering the lot. There's no obvious pattern of walk-ups over the day (Monday to Friday 9:00 a.m. to 6:00 p.m.) – it seems pretty random. But she needs to find the right balance between customer entry-patterns and sales staff numbers, this currently being three. The problem is that having too many salespersons means them waiting around too long for customers and too few means that potential unserved customers may be lost.

She's paying Shirley, an acknowledged expert in services management, $5000 to advise her about this issue. Shirley documents the following data:

- Sales persons spend an average of 20 minutes with each new customer (whether this leads to a sale or no sale).
- For any given hour (based on a random sample), an average of 14 targets are available (potential customers that typically enter the new car lot and then wander around the cars). The target arrival pattern follows a Poisson distribution.

Tasks: (Total 100 marks)

1. Following a customer walk-in, specify how long the *next-in-line* sales person should expect to wait (on average) for the next customer. (5 marks)
2. What is the probability (to two decimal places) of a sales person waiting 20 minutes for the next customer (show working)? (20 marks)
3. How many customers likely to be unmet on arrival each hour at the current sales staff level? Explain or justify your answer. (15 marks)
4. What advice should Shirley provide to Helen on the suitable number of persons to have in the sales team based on the data? State the implications of this advice given the current situation and also whether you consider that Shirley's' fee was justified (i.e., a good investment). (20 marks)
5. Prepare a 50 word (maximum) statement to communicate the staff level situation (and any changes) to the current sales team. What alternative strategies that may be used to address the issues identified by Shirley? (40 marks)

Question 3

The *Learn-a-Lot* educational theme park is about to open the 'great ghoul horror castle' tour ride. The plan is for this new ride to re-energise this education focussed attraction. The ride runs on a conveyer belt system (moving seats akin to a monorail) using the latest *curvilinear drag-free enhanced* people movement technology. The ride has a ghost theme that attempts to incorporate a little history of castles and local customs prevailing in medieval Europe.

With much funds invested, *Learn-a-Lot's* management wish to ensure positive customer (school groups) perceptions about this new ride. Although queuing for the ride is not desired, it can be seen as positive because this waiting time builds suspense among the children enhanced by viewing earlier participants faces (some stark, some excited, some pale, but all full of emotional expression) as they leave the ride via the exit door. Based on previous experience with school groups, management do not wish them to wait more than eight minutes before starting the ride.

Learn-a-Lot's management have asked you to provide information about expected waiting times for the first month. They have provided you with assumptions based on the best available data forecasts.

(1) Pre-arranged school groups (20 persons or less) may enter the ride at any time. Groups are served (starting the ride) following ticketed entry through a turnstile at a single operator booth. Once served, groups are taken to the start area, debriefed on safety, and loaded on a railed carriage. The service time is complete when all group participants have left the ride through the exit door.

(2) The ride takes five minutes.

(3) Groups arrive at a rate of nine per hour following a Poisson distribution.

Tasks: (Total 100 marks)

1. Calculate the mean numbers and mean times of groups in the system and in the queue. (20 marks)
2. Calculate the probability of a group proceeding straight to the ride without first queuing and the probability that a group will have to wait in a queue upon arrival to the ride. (10 marks)
3. The line space provided for queues is 10 metres per group. Management wish to ensure an adequate line-up space for 70% of the times that a new group arrives. How long should the line space be to achieve this outcome? (20 marks)
4. Write a 200 word (maximum) summary *layperson* description of the system characteristics including any assumptions made. This will be used to inform *Learn-a-Lot's* management. (20 marks)
5. Make and justify recommendations for changes (if required) to improve the service system including any assumptions required. (30 marks)

Question 4

Harry's Hotfoods, a fast food outlet popular with truckies, has just launched a healthy choice menu. One of Harry's new creations is the BANAPPLE – an apple banana mixed desert (with a few spices thrown in) deep-fried in coconut oil. Typical of Harry's *wacky ways,* this concoction is moulded either as a broken heart, 18 wheeler, or Minoan fertility goddess, and served with low-fat ice-cream. Sales in the first five weeks have been steady – though somewhat volatile.

Harry wonders if it's all worthwhile. He makes $2.20 on each serve (menu price $5.50) but requires a volume of 195 sales per week to make this a feasible menu item. He's asked you for some advice on this.

The following figures represent BANAPPLE sales for the first five weeks:

	Sales
Week 1	67
Week 2	95
Week 3	245
Week 4	163
Week 5	203

Tasks: (Total 100 marks)

1. Apply simple exponential smoothing to sales from weeks 1 to 5 as a prediction of week 6 sales using a smoothing constant of 0.4. Comment on the result and the suitability of the smoothing constant. (20 marks)

2. Apply a trend adjustment with a β of 0.3 to predict week 6 sales. Does this provide a better prediction compared to the method used in task 1? Justify your answer. (30 marks)

3. Actual sales in week 6 are 189. How does this compare to the forecasts? Is forecasting useful in this situation? Justify your answer. (20 marks)

4. Given the sales and forecasts, make a recommendation to Harry about the BANAPPLE. What activities or strategies may be used to supplement or support your recommendation?

   (30 marks)

Question 5

Gadge-Go, a gadget specialist national retailer, is about to spend big on advertising for its new "One-Tool-Caker" (a cake maker). This tool, produced by a specialty factory in Cambodia, is an all-in-one chopper/splicer/ dicer/ shredder/ masher/ stirrer/ folder/ smoother / piper. What kitchen wouldn't need one?

Gadge-go anticipates strong demand, at least for the first year. Because the company takes orders by telephone only (and these customers won't tolerate delays), inventory must be on hand ready for shipment.

From past experience, Gadge-Go has provided you with the following data about product expectations for year 1:

- Daily average customer sales (normal distribution - 365 days) 167
- Daily sales variation (as standard sales deviation): 29
- Time required from factory order to arrival (days): 36
- Cost of placing a factory order (translator, contract exchange): $127
- Opportunity cost of capital (annual): 14%
- "One-Tool- Caker" value $23.50
- Required service level 75% (company standard)

Tasks: (Total 100 marks)

1. Recommend to Gadge-go an order quantity and reorder point for the One-tool- caker based on a continuous review system for year 1. (30 marks)
2. For results in Part 1, provide an explanation for the method used to calculate the z-score. Is the safety stock level adequate? Why or why not? (10 marks)
3. Gadge-go wishes to compare results in Task 1 with a periodic review system. What review period and target inventory period would you recommend? Has the safety stock level now changed, and if so, why? (30 marks)
4. Make a recommendation for the inventory control system used by Gadge-go under the assumption that the One-Tool-Caker is class A product early in the lifecycle (year 1) and falls to class C product later (year 2) as new more advanced products become available. (10 marks)
5. Explain in detail the characteristics of the system recommended in Part 4 and the rationale for its implementation. (20 marks)