OPERATIONAL RESEARCH IN EDUCATION

Bin Packing: Theatre Booking
Answer Sheet

First Thoughts

Question 1
Why do you think audience members should be seated in such a way to minimise the amount of theatre space that is used?

- So that there is more space for people who buy tickets on the door
- In order to maximise profit
- Audience members feel more comfortable sitting together rather than on their own in different places around the theatre

Question 2
Many businesses, such as cinemas and university lecture halls, allow the audience to choose where they sit. What problems can this approach cause?

- Choosing to sit on the outside of a row and leaving gaps in the middle that are difficult to fill/see

Theatre Information

Question 3
Using the modelling packs, find a solution to seat the audience groups using the minimum amount of space as possible.

- No correct answer

Question 4
Use this space to write down how you found your solution. Which audience groups did you seat first? How many rows does your solution use altogether?

- No correct answer

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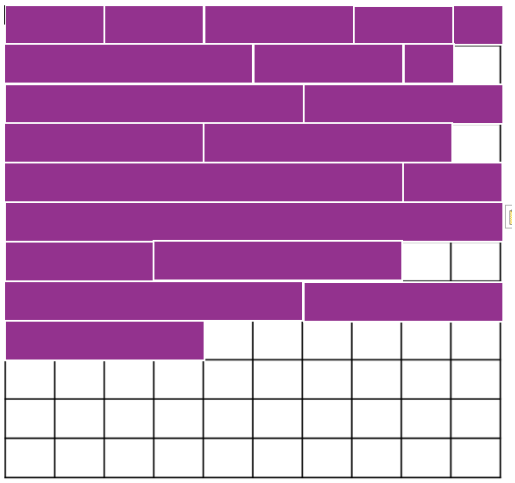
First Fit Algorithm

Question 5

Using this algorithm, what is the minimum number of rows required to seat the audience groups who have already booked?

- 9 rows

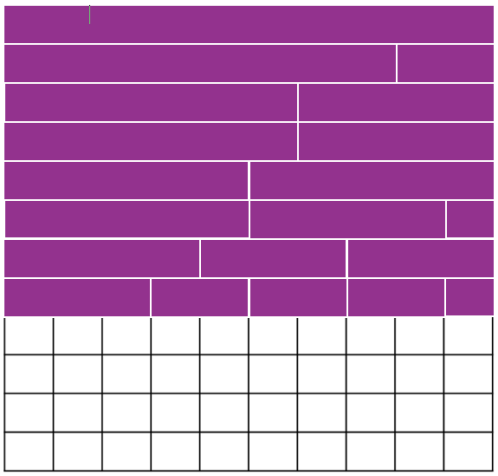


First Fit Decreasing Algorithm

Question 6

Using this algorithm, what is the minimum number of rows required to seat the audience groups who have already booked?

- 8 rows



Evaluation

Question 7

Write the name of the correct algorithm on the 'pros and cons' sheet. Optional: try organising the pros and cons into groups for each algorithm.

First Fit

- It is quick and easy to do
- It is not likely to lead to a good solution
- The theatre is most likely to use this algorithm
- (The first fit algorithm would most likely be used due to the fact that the theatre would have to allocate seats to members of the public on each new booking over time)

First Fit Decreasing

- It takes more time to do
- More effective/efficient use of the seating available
- Could result in higher profits for the theatre
- Some group bookings may not be able to sit together.
- (The first fit decreasing algorithm would have to be applied once all of the bookings have been made, which could lead to some bookings being unable to be allocated seating together as a group)

Question 8

Which is the best algorithm for the theatre to use?

- They are most likely to use "first fit" as they receive the bookings. The "first fit decreasing" could earn them more profit and is more efficient, but it takes longer and, by applying this after all bookings have been taken, it could result in audience groups being separated.