Problem Solving

The aim of this session is practice solving problem situations. Problem solving is an essential life skill and is a desirable skill in most jobs. Often questions of the nature you will be given are used at job interviews. Such problem statements are used as they distinguish candidates as solving problem statements require strong analytical skills.
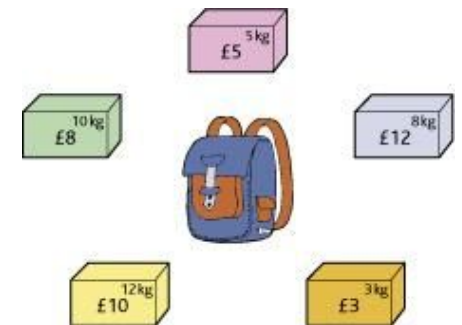
Complete this in pairs and write down your answer to each question

Problem 1

The problem is to fill the rucksack with no more than 20kg of weight, whilst giving the maximum value of the items possible.

£27 (2x £12 @ 8kg = £24 for 16kg plus a £3 block…

How would you explain how you solved this?...

Problem 2

Four ramblers, A, B, C and D, with just one torch between them, arrive at a bridge across a deep ravine on a very dark night. The torch is essential for a successful crossing of the ravine. The bridge is only capable of taking two ramblers at a time, safely.

How should then ramblers proceed to cross the bridge?

Additional constraints

A needs one minute to cross bridge

B needs two minutes to cross bridge

C needs five minutes to cross bridge

D needs ten minutes to cross bridge

Since each rambler needs the torch to cross, whenever a pair cross the bridge together, it is the slower rambler who determines the total time required to make the crossing

The crossing must be done in less than 19 minutes because the bus on the other side leaves in 18 minutes time.

A comes back = 1 minute

D + C across = 10 minutes

B comes back = 2 minutes

A + B cross = 2 minutes

Total 17 minutes

Model =

One pair cross two on far side – must send cheapest (A + B) = 2 minutes

One back one on far side = must send cheapest back (A) = 1 minutes

One pair cross three on far side – must send most expensive in time across (D + C) = 10 minutes

One back two on far side = must send cheapest back (B) = 2 minutes

One pair cross four on far side = remaining (A + B) = 2 minutes

Total time taken = 2 + 1 + 10 + 2 + 2 = 17 minutes

Problem 3

From a Microsoft Interview

2 paratroopers are dropped from a plane. The troopers land on line known to both of them, but they can land anywhere on that line. The troopers have 4 moves: move right, move left, pick up parachute, and put down parachute. They can also walk, jog or run.

Propose an instruction that can be given to both that will guarantee the 2 troopers will meet one another.

When land drop chute. Move left, walking. If find chute jog or run. Eventually you will meet your comrade further down the known line.

Problem 4

You are at a river that you want to cross with all your goods.

These consist of a chicken, a bag of grain and your dog, rover. You have to cross the river in your rowing boat but can only take one passenger at a time, either the chicken, bag of grain or rover the dog. You can't leave the chicken alone with the grain as the chicken will eat the grain. You can't leave your dog alone with the chicken as rover will eat the chicken. However, you know that rover will not eat grain.

Defining the problem

Initial situation: you, the chicken, the bag of grain and Rover are on one bank of the river with access to a rowing boat.

Resources: The rowing boat and your knowledge and problem solving skills.

Constraints: You can only take one passenger, you cannot leave Rover with the chicken, and you must not leave the chicken with the grain.

Goal: you, the chicken and Rover are on the opposite side of the river.

Ownership: You will plan and carry out the solution.

How do you get everything across intact?

1. Take chicken across and leave/ return

2. Take Rover across, leave him on the other side and come back with the chicken
3. Take the bag of grain across and leave it with rover
4. Go back and fetch the chicken and take it across.