

## Dynamic Programming Problems

### Problem 01

#### **Busy Transfer Window for Special One:**

Jose Mourinho also known as “The special one” (claimed by himself in the press) has completed his meeting with the club chairman Daniel Levy. He fumed at Mr. Levy and criticized his transfer policy. He enlightened the problems at their current squad player and their lack of performances. As a result the team did very bad result in the season, got 6th position in the league below from their fellow rivals and missed the champion’s league football for next season. Mourinho told the chairman that if he is willing to challenge rival teams for the championship title and bring back the club to Europe's top tier competition. To solve this he needs to buy a set of skilled players who are recently in good form in a scale of 100. Therefore he told his scouts to shortlist some players for buying in this transfer window. In order to buy these Mr. Levy allocated him a budget of 150 Million units of money. Mourinho has to buy players within the allocated budget from the shortlisted players. According to reports from scouts he shortlisted these players for possible transfer targets.



Now find an algorithm by which Mourinho will be able to buy players with summation of maximum amount of form within 150 M.

Player	Price	Form	Position
Aubameyang	80 M	96	Forward
Koulibaly	70 M	94	Defender
Thiago	45 M	83	Midfielder
Insigne	50 M	87	Forward
Kimmich	40 M	85	Defender
Sancho	60 M	89	Midfielder

**Sample Input:**

150 // Total budget  
6 // Total shortlisted players

Aubameyang, 80, 96, F  
Koulibaly, 70, 94, D  
Thiago, 40, 83, M  
Insigne, 50, 87, F  
Kimmich, 40, 85, D  
Sancho, 60, 89, M

**Output:**

Bought Players:  
Insigne -> Kimmich -> Sancho  
Maximum summation of form: 261

## **Problem 02**

### **Getting Judas back on his feet:**

Jose Mourinho A.K.A “Judas”, was not able to win the premier league title with Tottenham Hotspur even after spending 150 million in the transfer market. And so the board has decided to sack him. Now he is jobless, homeless and he has no money. But a man has to eat to survive. So he decides to sell his old trophies in the pawn shop to earn some money and rebuild his life.



Now it has to be said that poor Jose is not the same guy he was 10 years ago both physically and mentally. He has so many trophies he can sell but due to his ill physique he cannot carry all of them to the pawn shop at once. There are different trophies of different size and weights. Also not all the trophies can be sold at the same price, some are higher in value and some are lower. Now, Jose can carry a total of 15kg at once.

But there is one more thing to add. Jose does not like his champion's league trophies so he wants to sell them any way possible. So given the list of trophies and medals Jose has, it is your job to find the maximum money he can earn by selling his trophies including at least one of his champion's league trophies within this weight limit of 15kg.

Trophy	Weight (Kg)	Selling Price (million)	Club
Premier league	8	9.6	Chelsea
Champion's League	7	9.4	Inter Milan
Coach of the Year	5	8.3	Individual
Liga BBVA	5	8.7	Real Madrid
Champion's League	4	8.5	Porto
Europa League	6	8.9	Mansister United

### **Sample Input:**

15 // Max weight  
6 // Total trophies

Chelsea, 8, 9.6, Premier league  
Inter Milan, 7, 9.4, Champion's League  
Individual, 4, 8.3, Coach of the Year  
Real Madrid, 5, 8.7, Liga BBVA  
Porto, 4, 8.5, Champion's League  
Mansister United, 6, 8.9, Europa League

### **Output:**

Name of clubs whose trophies were sold:  
Real Madrid -> Porto -> Mansister United  
Maximum money he earned: 26.1 million