Economics 220, January 2022 **Your Name:** Dhyey Mavani
Homework 1

1. The Scranton Used Car Co. has the following 7 cars for sale.

Make	Year	Odometer	Top speed	Price	Type	Utility (U(A))
2005	Ford	150,000	60 mph	$2,000	Gas	6
2009	Honda	100,000	70 mph	$4,000	Gas	15
2010	Mercedes	120,000	90 mph	$8,000	Gas	33
2011	Volkswagen	60,000	70 mph	$7,000	Gas	14
2018	Tesla	80,000	80 mph	$12,000	Electric	122
2019	Chevy	30,000	80 mph	$18,000	Electric	120
2020	Nissan	40,000	90 mph	$16,000	Electric	131

As per the utility function defined below.

Phyllis wants to buy a used car. Her criteria for comparing any two cars are as follows. First, and most importantly, she prefers electric cars to gas-powered cars - this trumps all other considerations. Second, she prefers faster cars to slower cars. Third, and least importantly, if two cars have the same power source and the same speed, she prefers whichever car is cheapest.

Does Phyllis's choice function generate a complete, transitive preference ordering over cars? If so, what is it (using the preference relation symbols (use A ≽ B to denote a weak preference for A over B, ≻ for a strong preference, ~ for indifference)? If not, explain why not.

firstly, electric is preferred over gas-powered. → $\{T,C,N\} \succ_{Phyllis} \{F,M,H,V\}$
secondly, faster preferred over slower. → $\{M,N\} \succ_{Phyllis} \{T,C\} \succ_{Phyllis} \{H,V\} \succ_{Phyllis} F$
finally, cheaper car is preferred → $F \succ_{Phyllis} H \succ_{Phyllis} V \succ_{Phyllis} M \succ_{Phyllis} T \succ_{Phyllis} N \succ_{Phyllis} C$

⇒ $N \succ T \succ C \succ M \succ H \succ V \succ F$ → thus we can say that Phyllis generate a complete, transitive preference ordering over cars.

Can you write down a utility function that assigns a utility value to each car, consistent with Phyllis's preferences?

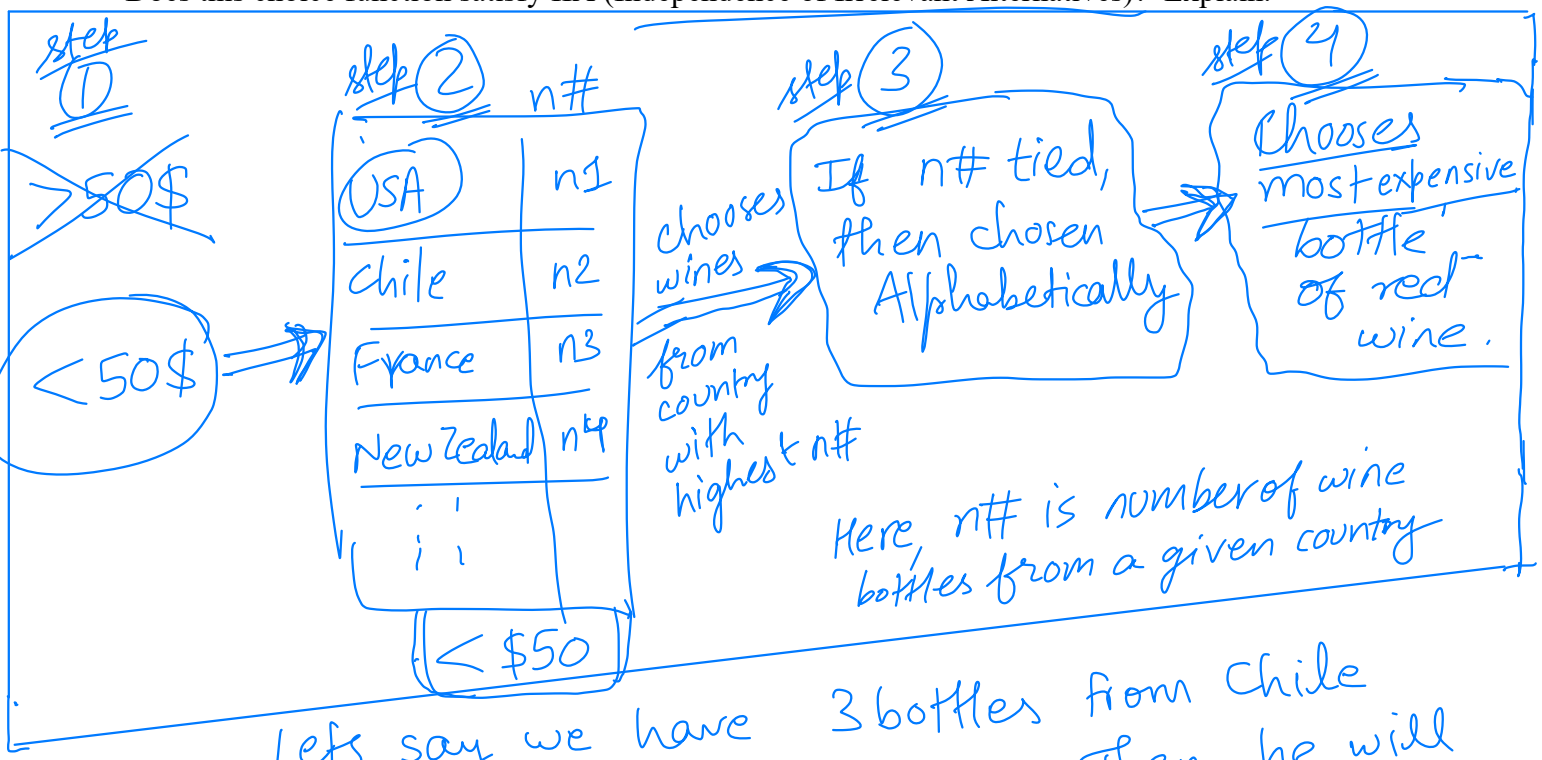
type: [electric = 1, gas = 0] → t
speed: Assigning numbers according to preference: [90 mph = 3, 80 mph = 2, 70 mph = 1, 60 mph = 0] → s
price: Assigning numbers according to preference [$2000 → 6, $4000 → 5, $7000 → 4, $8000 → 3, $12000 → 2, $16000 → 1, $18000 → 0] → p

⇒ $U(A) = (100 * t_A) + (10 * s_A) + p_A$

This model assigns utility to each car for Phyllis according to given preferences and can be verified from above preference ordering.

2. When choosing a bottle of wine in a restaurant, Stanley chooses as follows. First, he eliminates any bottles that cost more than $50. Then he counts the number of bottles of wine still under consideration (price $50 or less) on the wine list that come from each country (USA, Chile, France, New Zealand, etc.), and he chooses whichever country has the most wines on the list (if two or more countries are tied, he chooses alphabetically among them). He says he does this because the more bottles of wine there are on the list, the more likely it is that the restaurant has good information about wines from that country. Finally, since he likes red wine, he chooses the most expensive (less than or equal to $50) bottle of red wine from that country (again, if two or more are tied, he chooses alphabetically).

Does this choice function satisfy IIA (Independence of Irrelevant Alternatives)? Explain.

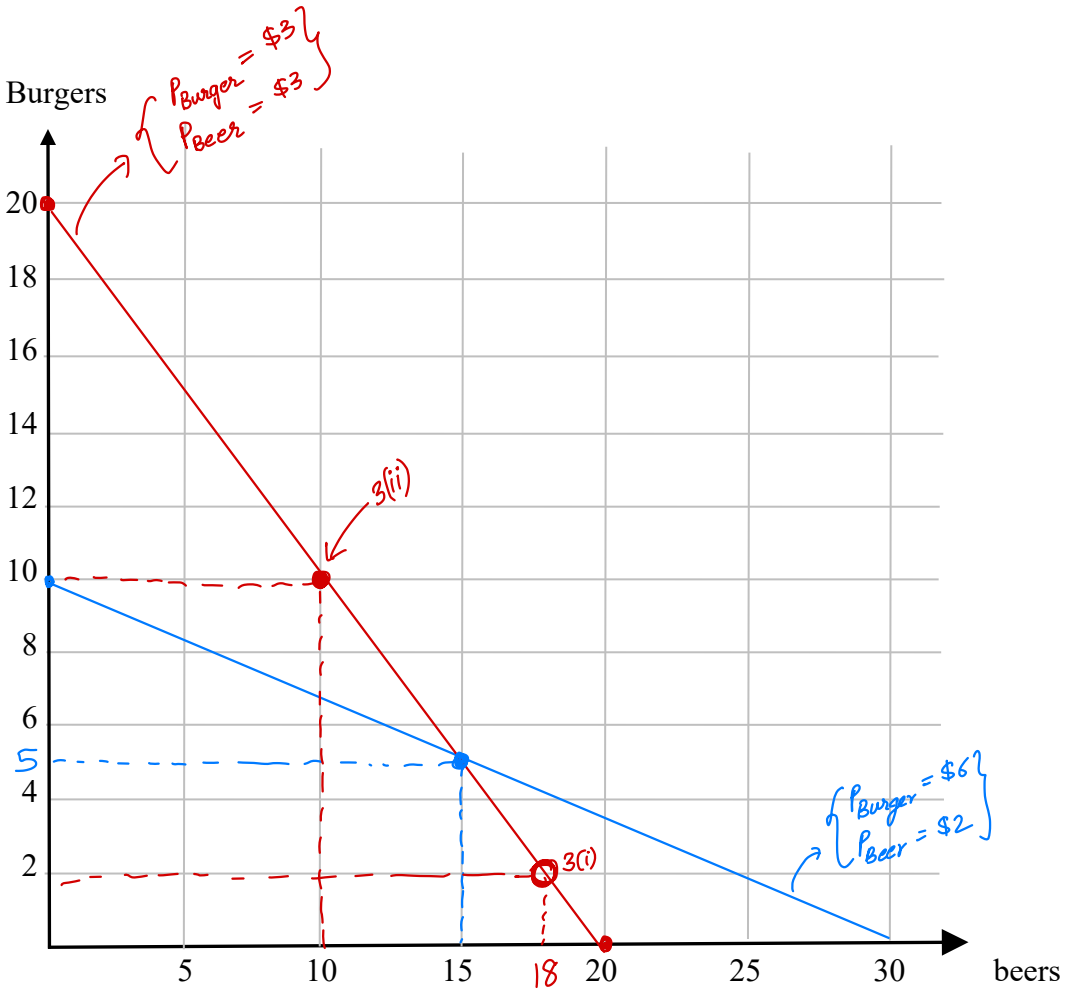


Lets say we have 3 bottles from Chile and 4 bottles from France. Then, he will pick one which is most expensive from France. Let's say we add a really cheap bottle from Chile. Now, as the numbers are tied, Stanley will choose Chile due to the alphabetical rule. This would lead to his final choice being the most expensive wine from Chile, and hence the IIA rule is not satisfied because the added cheapest bottle of wine from Chile was not ultimately chosen.

3. Burgers normally cost $6 and beers normally cost $2. Dwight allocates $60/week to buying these two items, and in a normal week, he buys 5 burgers and 15 beers (therefore, of all the combinations he can afford at these prices, we can assume this consumption bundle is weakly preferred to all others, ie., makes him happiest).

But then, one week, Dwight finds that burgers are on sale for $3 and that meanwhile, due to the failure of the hop harvest, the price of beer has risen to $3.

The diagram below shows the space of possible 'consumption bundles' (combiniations of burgers and beer). Sketch Dwight's budget constraint and show how it changed due to the change in price.



Dwight realizes that at the new prices, he can still afford his usual consumption bundle of 15 beers and 5 burgers. But he considers whether he should change his consumption given the new prices. Consider two scenarios.

(i) At the new prices ($3 for burgers and $3 for beer), Dwight chooses to buy 2 burgers and 18 beers. Show the location of this bundle on the budget diagram. Assuming Dwight's tastes have not changed, would this choice be 'consistent' (with a rational preference ordering) given his earlier choices? Explain.

This bundle is not consistent with his earlier choices because he prefers to get 15 beers and 5 burgers over 18 beers and 2 burgers which was an option in the previous budget constraint.

(ii) At the new prices, Dwight chooses to buy 10 burgers and 10 beers. Would this choice be consistent with a rational preference ordering? Explain.

This could be consistent with the rational choice ordering of preference because at new prices as this was not an option in the earlier budget constraint. But, as we don't have much information about the indifference curves, we cannot say if the choice is rational/irrational.