

**Problem**

Hakim has received \$30.00 as a birthday gift and wants to spend it on treating three friends and himself to lunch. The menu includes:

**Main**

Hamburger	\$4.00
Cheeseburger	\$4.50
Veggie Burger	\$3.50

**Sides**

French Fries	\$2.00
Onion Rings	\$2.50

**Drinks**

Regular	\$1.25
Large	\$1.75

- If each of the four boys orders 1 main, 1 side and 1 drink, in how many different ways could the boys select their lunch items?
- Suppose each boy orders the same three items. Which combinations can Hakim afford to pay for with his birthday money?

## Hints

**Hint 1** - Make a tree to see how many combinations exist.

**Solution**

- a) Represent the different food choices as follows:  
 H - hamburger, C - cheeseburger, V - veggie burger,  
 F - french fries, O - onion rings,  
 R - regular drink, L - large drink.

Creating the tree as shown at right, we see that there is a total of 12 different ways the boys could select their lunch items.

- b) If each boy selects the same three items, each lunch will cost the same. Since Hakim has only \$30, each lunch can cost at most  $\$30 \div 4 = \$7.50$ . Assigning costs to each of the choices reveals that the only combinations Hakim could afford are:

- hamburger + french fries + regular drink (\$7.25);
- veggie burger + french fries + regular drink (\$6.75);
- veggie burger + french fries + large drink (\$7.25); or
- veggie burger + onion rings + regular drink (\$7.25).

