Problem of the Week
Problem B and Solution
Ch-ch-ch-change!

Problem

Canada has the following coins in circulation: nickel (5 cents), dime (10 cents), quarter (25 cents), loonie ($1), and toonie ($2). Australia, on the other hand, has coins with value 5 cents, 10 cents, 20 cents, 50 cents, $1, and $2.

Using the least number of coins in each case, determine how to obtain multiples of 5 cents, from 5 cents to 95 cents, in each currency. For how many of the amounts did you use a different number of coins in Canadian currency than in Australian currency?

Solution

The combinations are shown in the following table for each currency. An asterisk (*) is in the "Amount" column for any amount where a different number of coins were used. The table reveals a different number of coins were used for 12 of the amounts.

Amount $	Canadian $	Australian $
0.05	0.05	0.05
0.10	0.10	0.10
0.15	0.10 + 0.05	0.10 + 0.05
* 0.20	0.10 + 0.10	0.20
* 0.25	0.25	0.20 + 0.05
0.30	0.25 + 0.05	0.20 + 0.10
* 0.35	0.25 + 0.10	0.20 + 0.10 + 0.05
* 0.40	0.25 + 0.10 + 0.05	0.20 + 0.20
0.45	0.25 + 0.10 + 0.10	0.20 + 0.20 + 0.05
* 0.50	0.25 + 0.25	0.50
* 0.55	0.25 + 0.25 + 0.05	0.50 + 0.05
* 0.60	0.25 + 0.25 + 0.10	0.50 + 0.10
* 0.65	0.25 + 0.25 + 0.10 + 0.05	0.50 + 0.10 + 0.05
* 0.70	0.25 + 0.25 + 0.10 + 0.10	0.50 + 0.20
0.75	0.25 + 0.25 + 0.25	0.50 + 0.20 + 0.05
* 0.80	0.25 + 0.25 + 0.25 + 0.05	0.50 + 0.20 + 0.10
0.85	0.25 + 0.25 + 0.25 + 0.10	0.50 + 0.20 + 0.10 + 0.05
* 0.90	0.25 + 0.25 + 0.25 + 0.10 + 0.05	0.50 + 0.20 + 0.20
* 0.95	0.25 + 0.25 + 0.25 + 0.10 + 0.10	0.50 + 0.20 + 0.20 + 0.05