The Memory Box — Variable Trace Worksheet

Name: _____ **Date:** _____

Your Quest

You are a hero on an adventure. As events happen, the values of your variables change. Your job: **trace every variable value after every event**.

Rule: Fill in EVERY cell — even if a variable didn't change for that event. Carry the value forward.

The Story

Starting values:

- `HEALTH = 10`
- `GOLD = 0`
- `ITEMS = []` *(an empty list — you have no items yet)*

Event 1: You find a healing potion on the ground. `ITEMS = ITEMS + [potion]`

Event 2: A goblin throws a rock at you. `HEALTH = HEALTH - 3`

Event 3: You discover a treasure chest! `GOLD = GOLD + 20`

Event 4: You buy a map from a travelling merchant. `GOLD = GOLD - 8` `ITEMS = ITEMS + [map]`

Event 5: You try to buy a shield. It costs 15 gold. `GOLD = GOLD - 15` `ITEMS = ITEMS + [shield]`
(Careful — does your GOLD go negative? Note this in the discussion section below.)

Event 6: You use the healing potion to recover health. `HEALTH = HEALTH + 5` `ITEMS = ITEMS - [potion]`

Event 7: You sell the map to another traveller. `GOLD = GOLD + 6` `ITEMS = ITEMS - [map]`

Event 8: You reach the castle. Final check!

Trace Table

Event	HEALTH	GOLD	ITEMS
Start	10	0	[]
Event 1			
Event 2			
Event 3			

Event	HEALTH	GOLD	ITEMS
Event 4			
Event 5			
Event 6			
Event 7			
Event 8 (Final)			

Discussion Questions

Event 5 — GOLD goes negative: After buying the shield, GOLD = ___. Is this a problem?

In a real game, what should the program do to PREVENT the player from spending gold they don't have?

Event 6 — Removing an item: After using the potion, ITEMS = ___. This worked fine. But what if you had tried to remove the [potion] in Event 2 (before you picked it up)?

What should a program do if you try to remove something that isn't in the list?

General reflection: If you were writing this as a real program, which variable would be hardest to manage? Why?