Variables and Magic Gifts

A variable is a place in memory where you can store a single piece of data. Each variable is associated with a name. Programmers can reference, modify, or set the value of a variable using its name. Variables can also have associated types, such as integer, Boolean, or float. These types indicate what kind of information can be stored in the corresponding variable.

ANN MADE IT LESS than two miles from the castle before the crushing weight of her task once again descended on her. The fate of the kingdom depended on her finding a way to stop the darkness, yet she didn't know what it was or even how to find out. She felt utterly alone.

Ahead of her, Ann saw a man walking up the road wearing a bright blue wizard's cloak with silver threading. She instantly recognized Marcus; no other wizard dressed so fashionably. He was also one of the kingdom's most powerful wizards and a staunch friend of her father's. If anyone could help her in the quest, he could.

"Sir Wizard!" she called out to him, embarrassed that she had never learned the proper etiquette for addressing a wizard.

Marcus looked up with a smile. "Princess Ann. How are you this lovely morning? Out for a ride, I see."

"Unfortunately, I'm not," responded Ann. "I'm embarking on an important quest. The seers have predicted a coming darkness,

and I must stop it."

"Alone?" asked Marcus. His smile vanished.

"Yes. The prophecy said that I 'must journey forth alone to stop the coming darkness.' But ... perhaps you could still join me. Technically, we met after I had already journeyed forth alone. In fact, I've been journeying alone for about two miles. And, I could really use your help," Ann pleaded.

Marcus shook his head. "That wouldn't be a good idea. Prophecies are fiddly things, and they don't like it when you try to find technicalities. One time I thought I found a loophole in a prophecy; as a result, it rained Haborian Slugs for three days. It was terribly messy. You must go alone."

Ann's heart sank. Tears started to well up in the corners of her eyes, but she fought them back and nodded bravely to Marcus. She knew he was right.

"Maybe I can still help you, though," continued Marcus. "Let me see what I have with me." As he spoke he rummaged through a small pack. After a moment, he extracted a couple of curious looking objects.

"I have with me some of my latest magical works," he explained. "They're based on variable magic."

"Variable magic?" asked Ann. "What's that? And what happened to your other work?"

"I'm taking a break from all plant-related magic for a while. A terrible accident with roses," Marcus said without further explanation. He trailed off, and Ann thought she detected a hint of anger in his expression.

He shook his head as though clearing a horrible image. Then he continued, "Variable magic is a useful, but often overlooked, form of magic. It's based on the simple idea of storing values. Take this rock for instance. It uses what's known as a 'location' variable."

"What does it do?" asked Ann, her eyes wide with interest. After algorithmic design, magic was her second favorite conversation topic.

"Stores a value, of course," answered Marcus. "Weren't you listening? It stores a location."

"So, you could use it to …" Ann paused as she thought. She couldn't think of a single use case.

"You can use it to find your way back to a given place," Marcus finished. "For example, you could hide treasure and use the rock to store its secret location. Or you could store your current location before heading into a dangerous bog, so you can find your way out. Or you could use it to find your horse in a particularly large parking lot. It has many practical, everyday uses."

"I see," acknowledged Ann. She silently wondered what Marcus's "everyday" life must be like.

"You simply tap the rock with your index finger five times," explained Marcus. "Then the rock will store your current location in a magic variable. No matter where you are, the rock will continue to point toward the saved location until you set a new one."

"Like a compass?" asked Ann.

"Exactly!" exclaimed Marcus. "Except you set the location instead of it always pointing north."

"It can only store a single location?" asked Ann.

"That's how a variable works; it only stores one piece of information," answered Marcus. "Think about a small pocket—you can fit one thing in it. You can change what you have in it, but you can never have two things in it at the same time."

"I guess it would depend on the size of the pocket," commented Ann.

"Tiny, tiny, tiny," responded Marcus. "A tiny pocket that can only fit one thing."

"Oh. Well, thank you." said Ann. She was still uncertain about the actual usefulness of a compass rock.

"I also have this for you," said Marcus, handing her a small coin purse with a counter on the front.

"A purse?" asked Ann.

"A *magic* purse," corrected Marcus. "It works like a calculator. It uses a variable called 'value' to track how much money the

purse contains. This purse displays that amount on the front.

"When you put a coin in, that amount is added to the 'value' variable, and when you take a coin out, the appropriate amount is subtracted from 'value.' It always tells you how much money you have in the purse."

Marcus demonstrated the concept by inserting a nickel into the purse. The counter on the front increased by five cents. Ann imagined a magical variable within the purse changing as the result of the addition.

$$value = value + 0.05$$
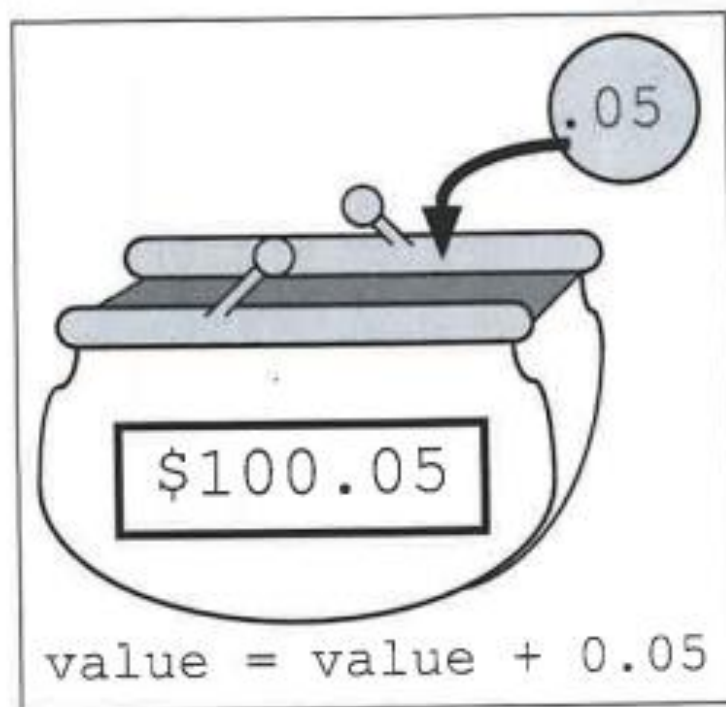
"Why would I need that?" asked Ann. "I can always count the money."

"Ah," said Marcus with a smile. "Counting takes time. What if you're in a hurry?"

"I see. Thank you again for these wonderful gifts," Ann responded with false enthusiasm. She already knew that the gifts wouldn't help her.

"I hope they help you on your quest," replied Marcus. Then he quietly added, "If I had known you were departing on a quest, I would have brought better magical items for you."

He shrugged, closed up his pack, and prepared to leave.

"Sir?" ventured Ann. "May I ask you for one more favor? Do

you have any advice to give me on my quest? Any helpful pointers on where to start?"

Marcus paused for a long moment and looked off into the distance. "I don't know what the darkness is, or where you should go. I'm sorry. Instead, I'll leave you with the following advice: don't get eaten by a dragon. I hear it's terribly unpleasant."

With those words, Marcus continued his journey toward the castle. He hummed to himself as he went.

Once again, Ann felt a pit of despair in her stomach.