VE280 Programming and Elementary Data Structures

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enum

DILBERT









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Learning Objectives

- Know when to use enum type
- Know how to use enum type

Introducing enums

- In addition to single constants, we may need to categorize data.
- For example, there are four different suits in cards:
 - Clubs



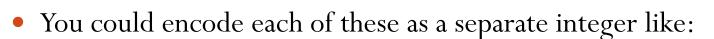
Diamonds



Hearts



Spades



```
const int CLUBS = 0;
const int DIAMONDS = 1;
// and so on...
```

Introducing enums

```
const int CLUBS = 0;
const int DIAMONDS = 1;
```

- Unfortunately, encoding information this way is not very convenient.
- For example, consider the predicate isRed()
 bool isRed(int suit);

 // REQUIRES: suit is one of Clubs,

 // Diamonds, Hearts,

 or Spades

 // EFFECTS: returns true if the color

 of this suit is red.

Introducing enums

```
const int CLUBS = 0;
const int DIAMONDS = 1;

bool isRed(int suit);

// REQUIRES: suit is one of Clubs,

// Diamonds, Hearts, or Spades

// EFFECTS: returns true if the color

// of this suit is red.
```

- This is annoying, since we need this REQUIRES clause; not all integers encode a suit.
- There is a better way: the **enumeration** (or **enum**) type.

enums

• You can define an enumeration type as follows:

• To define variables of this type you say:

```
enum Suit t suit;
```

• You can initialize them as:

```
enum Suit t suit = DIAMONDS;
```

- Once you have such an enum type defined, you can use it as an argument, just like anything else.
- Enums are passed by-value, and can be assigned.

enums

• With enum, the specification for the function isRed() can be simplified by removing the REQUIRES clause.

```
bool isRed(enum Suit_t s);
// EFFECTS: returns true if the color
// of this suit is red.
```

enums

```
bool isRed(enum Suit t s) {
  switch (s) {
      case DIAMONDS:
      case HEARTS:
             return true;
            break;
      case CLUBS:
      case SPADES:
             return false;
            break;
      default:
            assert(0);
            break;
```

enums

• If you write

• Using this fact, it will sometimes make life easier

```
enum Suit_t s = CLUBS;
const string suitname[] = {"clubs",
      "diamonds", "hearts", "spades"};
cout << "suit s is " << suitname[s];</pre>
```



Which statements are true?

Select all the correct answers.

- A. HEARTS == 2*DIAMONDS.
- **B.** Integer operations are valid over enum values.
- C. If c is of type Suit_t, then c = 2*HEARTS is valid.
- **D.** If t is a non-empty array, then t[2*CLUBS] is valid.



References

- enum
 - C++ Primer, 4th Edition, Chapter 2.7