Lecture 2

Review

Given an int number, e.g.:
int number = 10;

Write code that, if the number is a multiple of 5, it prints HiFive, and if the number is divisible by 2, it prints HiEven.

Logical Operators

Operator	Name	Description
!	not	logical negation
&&	and	logical conjunction
||	or	logical disjunction

Truth Table for not Operator: !

p	!p	Example (assume age = 24, weight = 140)
true	false	!(age > 18) is false, because (age > 18) is true.
false	true	!(weight == 150) is true, because (weight == 150) is false.

Truth Table for and Operator: &&

p_1	p_2	p_1 && p_2	Example (assume age = 24, weight = 140)
false	false	false	(age <= 18) && (weight < 140) is false, because both conditions are both false.
false	true	false	(age <=18) && (weight ==140) is false, because one condition is false
true	false	false	(age > 18) && (weight > 140) is false, because (weight > 140) is false.
true	true	true	(age > 18) && (weight >= 140) is true, because both (age > 18) and (weight >= 140) are true.

Truth Table for or Operator: ||

p_1	p_2	p_1 || p_2	Example (assume age = 24, weight = 140)
false	false	false	(age > 34) || (weight >= 150) is false, because both evaluate to false
false	true	true	(age > 34) || (weight <= 140) is true, because (age > 34) is false, but (weight <= 140) is true.
true	false	true	(age > 14) || (weight >= 150) is false, because (age > 14) is true.
true	true	true	(age > 14) || (weight <=150) is true, because both conditions evaluate to true

Practice: Determining Leap Year?

This program first prompts the user to enter a year as an int value and checks if it is a leap year.

A year is a leap year if it is divisible by 4 but not by 100, or it is divisible by 400.

You try: How would you write this conditional?

Problem: Determining Leap Year?

This program first prompts the user to enter a year as an int value and checks if it is a leap year.

A year is a leap year if it is divisible by 4 but not by 100, or it is divisible by 400.

(year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)

Problem: Computing Taxes

The US federal personal income tax is calculated based on the filing status and taxable income. There are four filing statuses: single filers, married filing jointly, married filing separately, and head of household. The tax rates for 2009 are shown below.

Marginal Tax Rate	*Single*	*Married Filing Jointly or Qualifying Widow(er)*	*Married Filing Separately*	*Head of Household*
10%	$0 – $8,350	$0 – $16,700	$0 – $8,350	$0 – $11,950
15%	$8,351 – $33,950	$16,701 – $67,900	$8,351 – $33,950	$11,951 – $45,500
25%	$33,951 – $82,250	$67,901 – $137,050	$33,951 – $68,525	$45,501 – $117,450
28%	$82,251 – $171,550	$137,051 – $208,850	$68,526 – $104,425	$117,451 – $190,200
33%	$171,551 – $372,950	$208,851 – $372,950	$104,426 – $186,475	$190,201 – $372,950
35%	$372,951+	$372,951+	$186,476+	$372,951+

Problem: Computing Taxes, cont.

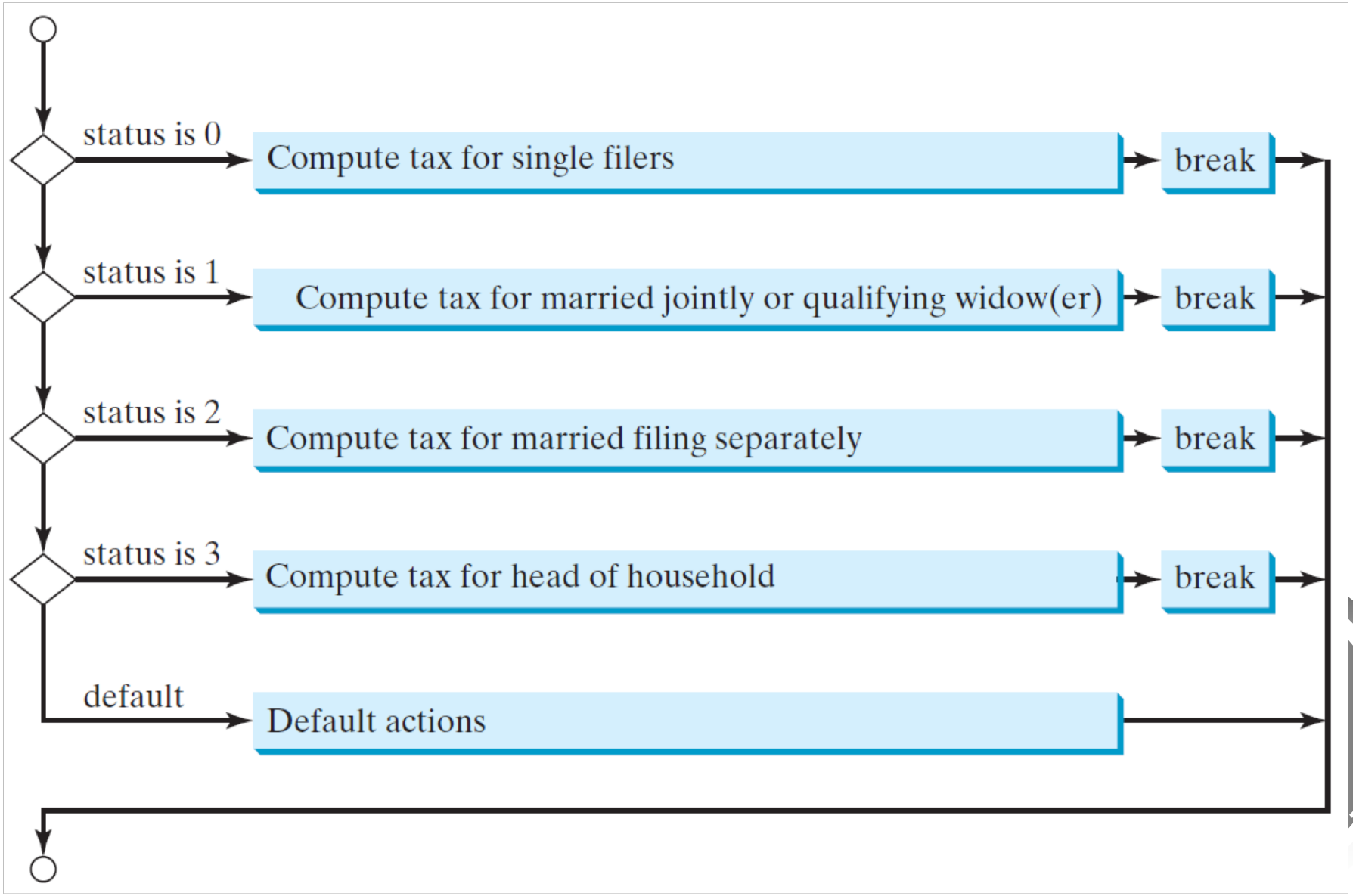
```
if (status == 0) {
  // Compute tax for single filers
}
else if (status == 1) {
  // Compute tax for married file jointly
  // or qualifying widow(er)
}
else if (status == 2) {
  // Compute tax for married file separately
}
else if (status == 3) {
  // Compute tax for head of household
}
else {
  // Display wrong status
}
```

ComputeTax Run

`switch` Statements

```
switch (status) {
  case 0:  compute taxes for single filers;
           break;
  case 1:  compute taxes for married file jointly;
           break;
  case 2:  compute taxes for married file separately;
           break;
  case 3:  compute taxes for head of household;
           break;
  default: System.out.println("Errors: invalid status");
           System.exit(1);
}
```

`switch` Statement Flow Chart



animation

Trace switch statement

Suppose day is 2:

```
switch (day) {
  case 1:
  case 2:
  case 3:
  case 4:
  case 5: System.out.println("Weekday"); break;
  case 0:
  case 6: System.out.println("Weekend");
}
```

animation

Trace switch statement

Match case 2

```
switch (day) {
  case 1:
  case 2:
  case 3:
  case 4:
  case 5: System.out.println("Weekday"); break;
  case 0:
  case 6: System.out.println("Weekend");
}
```

animation

Trace switch statement

Fall through case 3

```
switch (day) {
  case 1:
  case 2:
  case 3:
  case 4:
  case 5: System.out.println("Weekday"); break;
  case 0:
  case 6: System.out.println("Weekend");
}
```

animation

Trace switch statement

Fall through case 4

```
switch (day) {
  case 1:
  case 2:
  case 3:
  case 4:
  case 5: System.out.println("Weekday"); break;
  case 0:
  case 6: System.out.println("Weekend");
}
```

animation

Trace switch statement

Fall through case 5

```
switch (day) {
  case 1:
  case 2:
  case 3:
  case 4:
  case 5: System.out.println("Weekday"); break;
  case 0:
  case 6: System.out.println("Weekend");
}
```

animation

Trace switch statement

Encounter break

```
switch (day) {
  case 1:
  case 2:
  case 3:
  case 4:
  case 5: System.out.println("Weekday"); break;
  case 0:
  case 6: System.out.println("Weekend");
}
```

animation

Trace switch statement

Exit the statement

```
switch (day) {
  case 1:
  case 2:
  case 3:
  case 4:
  case 5: System.out.println("Weekday"); break;
  case 0:
  case 6: System.out.println("Weekend");
}
```

Your Turn!

- Write a program that will allow a user to choose the size of drink that they want and will output the price of the drink using a switch statement:

Small: $1.00

Medium: $1.50

Large: $2.00

Big gulp: $3.00