

CS111 Introduction to Computers

Programming Sheet 3 (Conditional Statements)

- 1) Determine the values of the following conditional expressions
(0: False, any other value: True):
 - (a) $((\text{size} > 5) \parallel (\text{sum} \geq 150))$ given size = 10, sum = 150
 - (b) $((\text{cont}) \&\& (\text{value} > 'A'))$ given cont = 0, value = 'G'
 - (c) $(!\text{halt} \&\& (\text{sum} < 100 \parallel \text{test}))$ given halt = 0, sum = 150, test = 1

- 2) What are the outputs of the following programs:
 - (a)

```
wt = 100;
if (wt > 200) printf("too heavy\n");
else printf("just right\n");
printf("weight tested\n");
```

 - (b)

```
age = 55;
if (age < 20) printf("young");
else if (age < 40) printf("prime");
else if (age < 60) printf("middle age");
else printf("old");
```

- 3) **Write a program** to simulate a state police radar gun. The program should take an automobile speed and display the message "*speeding*" if the speed exceed 65 mph.

- 4) Los Angeles sometimes has very smoggy conditions. These conditions are largely due to L.A.'s location between mountain ranges, coupled with prevailing winds off the ocean that tend to blow pollutants from the city's many automobiles up against the mountains. Three components of smog—ozone, nitrogen oxide, and carbon monoxide—are particular health concern. A pollutant hazard index has been developed for each of the three primary irritants. If any index rises above 100, the air is listed as "*unhealthful*" in forecasts to Los Angeles residents. If the index for anyone rises above 200, a "*first-stage smog alert*" is issued and certain activities are restricted in the affected part of the Los Angeles basin. If an index goes over 275, a "*second-stage smog alert*" is called and more severe restrictions apply. **Write a program** that takes as input the daily hazard index for each of the three pollutants and that identifies unhealthy or first- or second- stage alert situations.

- 5) **Write a C program** that calculates bills for the Electricity company. There are 3 types of customers: residential (code R) , commercial (code C) , and Industrial (code I).
- For a code R customer, the bill is \$10 plus \$0.05 for each kilowatt used.
 - For a code C customer, the bill is \$1000 for the first 2000 kilowatt, and \$0.005 for each **additional** kilowatt used.
 - For a code I customer, the bill is \$1000 if he used less than 4000 kilowatt, \$2000 if he used between 4000 and 10000 kilowatt, or \$3000 if he used more than 10000 kilowatt.

The inputs of the program should be the type of customer (R C or I) and the kilowatts used. The output should be the amount of money the customer has to pay.

- 6) The National Earthquake Information Center has asked you to **write a program** implementing the following decision table to characterize an earthquake based on its Richter scale number.

Richter Scale No.	Characterization
$n < 5.0$	Little or no damage
$5.0 \leq n < 5.5$	Some damage
$5.5 \leq n < 6.5$	Serious damage: walls may crack or fall
$6.5 \leq n < 7.5$	Disaster: houses and buildings may collapse
higher	Catastrophe: most buildings destroyed

Could you handle this problem with a "switch" statement? If so, use a "switch" statement; if not, explain why.

- 7) Write a switch statement that assigns to the variable **lumens** the expected brightness of a standard light bulb whose wattage has been stored in watts. Then rewrite the program using an equivalent if-statement. Use the following table:

Watts	Brightness (in lumens)
15	125
25	215
40	500
60	880
75	1000

