ECOR 1606 Winter 2014: Assignment #1 Solution

Question 1

Version 1: correct: using "if … else if" statements

```
if (cash>=$4) then
        purchase hot chocolate
else if (cash>=$3.50) then
        purchase coffee
else if (cash>=$3) then
        purchase tea
else if (cash>=$2) then
        purchase soft drink
endif
```

Version 2: correct: using regular "if" statements only

```
if (cash>=$4) then
        purchase hot chocolate
else
        if (cash>=$3.50) then
                purchase coffee
        else
                if (cash>=$3) then
                        purchase tea
                else
                        if (cash>=$2) then
                                purchase soft drink
                        endif
                endif
        endif
endif
```

Version 3: correct but inefficient (more conditions are evaluated in some cases – else if or else is better)

```
if (cash>=$4) then
        purchase hot chocolate
endif
if (cash>=$3.50 and cash<$4) then
        purchase coffee
endif
```

if (cash>=$3 and cash<$3.50) **then**
    purchase tea
endif
if (cash>=$2 and cash<$3) **then**
    purchase soft drink
endif

<u>Version 4</u>: also correct but inefficient (more conditions are evaluated in some cases – here the additional conditions "and …" can just be removed)

if (cash>=$4) then
    purchase hot chocolate
else if (cash>=$3.50 and cash<$4) **then**
    purchase coffee
else if (cash>=$3 and cash<$3.50) **then**
    purchase tea
else if (cash>=$2 and cash<$3) **then**
    purchase soft drink
endif

<u>Version 5</u>: incorrect: many beverages may be purchased

if (cash>=$4) **then**
    purchase hot chocolate
endif
if (cash>=$3.50) **then**
    purchase coffee
endif
if (cash>=$3) **then**
    purchase tea
endif
if (cash>=$2) **then**
    purchase soft drink
endif

<u>Version 6</u>: incorrect: wrong beverage may be purchased

if (cash>=$3) **then**
    purchase tea
else if (cash>=$4) **then**
    purchase hot chocolate
else if (cash>=$2) **then**
    purchase soft drink
else if (cash>=$3.50) **then**

    purchase coffee
endif

Question 2

flip over top card
while (desired card is not equal to flipped over card) **do**
    flip over top card
endwhile

Question 3

if (x is 0 and y is zero) **then**
    display “The point is the origin”
else if (y is 0) **then**
    display “The point is on the x-axis.”
else if (x is 0) **then**
    display “The point is on the y-axis.”
else if (x greater than 0) **then**
    if (y greater than 0) **then**
        display “The point is in quadrant I.”
    else
        display “The point is in quadrant IV.”
    endif
else if (y greater than 0) **then**
    display “The point is in quadrant II.”
else
    display “The point is in quadrant III.”
endif

Note that the fewer total comparisons the better – total here is 7.

Question 4

Version 1:

result is 0 // will be our final answer
multFactor is 1 // whether we add (1) or subtract (-1) the current term
counter is 1 // denominator of the current term (1, 3, 5, …)
while (n greater than or equal to zero) **do**
    result is result plus: 4 divided by counter and multiplied by multFactor
    counter is counter plus 2
    multFactor is multFactor multiplied by -1
    n is n minus 1 // we will count down to 1
endwhile

Version 2:

result is 0 // will be our final answer
count is 0 // we will count up to n
while (count less than or equal to n) **do**
    if (2 divides evenly into count) **then** // i.e. count is even
        result is result plus: 4 divided by (2*count+1)
    else // n must be odd
        result is result minus: 4 divided by (2*count+1)
    endif
    count is count plus 1
endwhile

Note that it's fine to use a more mathematical notation here, e.g. count = count + 1, etc.

Remember that you may only use addition, subtraction, multiplication, and division. Thus using additional functions to determine if a number is odd/even, and or just stating "count is even" is not quite following the rules!