COMP 1005: Midterm Solutions

There are often multiple ways to answer a question, so keep that in mind when looking at my suggested answers below.

Question 1

Definition should be something along the lines of one (or more) of the following:

- a set thinking or problem solving strategies used to solve problems with computers
- a way of thinking that lets you bend computation to your needs
- the new literacy of the 21st century

Examples of what might work for the characteristics part (of course there are many other possibilities):

- expressing problems in a way the computer can solve them
    - getting a character on the screen to look like it's wandering toward a target
    - figuring out the math and formulas for laying out a book cover automatically no matter its size
- organizing and analyzing data
    - we haven't really done this yet in class, but you might have come up with some creative, reasonable answer
- modelling, abstracting, simulating data
    - simulating a simple artificial intelligence
    - simulating how a jukebox would work
    - abstracting how to draw an ellipse into a simple command that makes it draw (or other function examples)
- automating solutions through algorithmic thinking
    - pretty much everything we do

Question 2

You can use any explanation they want here, including the box analogy from class or the analogy you made on the assignment. It has to make sense and be something a ten year old could grasp.

Question 3

It will NOT contain 11 because there are several if statements in a row, which are independent of each other. That is, every time a new if appears, we start checking every if/else if/else in the chain until a true statement has been found. The last if statement's body that ends up being executed is the one that assigns 10 to the variable. Had these been if/else's, only the body of the first true statement would have executed. You can double check this in Processing if you want.

Question 4

41118
(you can double check in Processing)

Question 5

The ellipse will be yellow (all or nothing for the one mark). Again you can check it in Processing, but you have to add a bit more code to make it run (make the window a larger size too).

Question 6

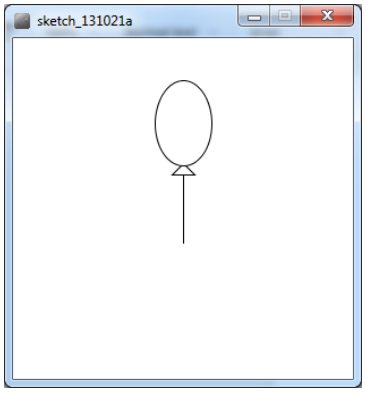
You can answer both questions at once if they want to.

Purpose: Setup is used to set anything up that only needs to be done once (like corner mode and that kind of thing) or to give reasonable initial values to variables. Draw is used to make changes every frame to, for example, create animations.

When: Setup is called exactly once at the very beginning of the program. Draw is called repeatedly every frame (some number of times per second).

Question 7

This is what the sketch draws:



Question 8

```
if (mouseX >= objectX && mouseX <= objectX + width
    && mouseY >= objectY && mouseY <= objectY + height)
```

Question 9

One possible answer that was checked in Processing...

```
int currentColor = 0;

void setup()
{
  size(600, 400);
  background(0);
}

void draw()
{
  background(currentColor);
}

void mouseClicked()
{
  currentColor += 5;
  if (currentColor > 255)
  {
      currentColor = 0;
  }
}
```

Question 10

One possible answer that was checked in Processing...

```
int ballX;
int ballY;

int speedX;
int speedY;

boolean horizontal;

void setup()
{
  size(600, 400);
```

```
  background(255);

  ballX = width/2;
  ballY = height/2;

  speedX = -5;
  speedY = 0;

  horizontal = true;
}
void draw()
{
  background(255);
  ellipse(ballX, ballY, 20, 20);

  ballX += speedX;
  ballY += speedY;

  if (ballX < 0)
  {
      ballX = 0;
      speedX *= -1;
  }
  if (ballX > width)
  {
      ballX = width;
      speedX *= -1;
  }
  if (ballY < 0)
  {
      ballY = 0;
      speedY *= -1;
  }
  if (ballY > height)
  {
      ballY = height;
      speedY *= -1;
  }
}
void mouseClicked()
{
  if (horizontal)
  {
```

```
        speedY = speedX;
        speedX = 0;
        horizontal = false;
    }
    else
    {

        speedX = speedY;
        speedY = 0;
        horizontal = true;
    }
}
```