CSC 108H1 F 2009 Test 1
Duration — 35 minutes
Aids allowed: none

Student Number: |_|_|_|_|_|_|_|_|_|_|

Last Name: _____ **First Name:** _____

Lecture Section: L0102 **Instructor: Gries**

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*Do **not** turn this page until you have received the signal to start.*
(Please fill out the identification section above, **write your name on the back of the test**, and read the instructions below.)
Good Luck!

This midterm consists of 3 questions on 8 pages (including this one). *When you receive the signal to start, please make sure that your copy is complete.* Comments and docstrings are not required except where indicated, although they may help us mark your answers. They may also get you part marks if you can't figure out how to write the code. No error checking is required: assume all user input and all argument values are valid.
If you use any space for rough work, indicate clearly what you want marked.

1: _____/ 4
2: _____/ 6
3: _____/ 8

TOTAL: _____/18

Question 1. [4 MARKS]

Suppose these functions have been defined:

```
import media

def do_something(left, right):
    left = right
    for pixel in left:
        media.set_red(pixel, 0)

def do_stuff(a, b, c):
    a = b + c
    c = a + b
    return a
```

The following code runs without errors. Fill in the boxes below to show the output printed or answer the question, as indicated.

```
a = 145
one = 20
two = 25
one = do_stuff(a, one, two)
print a
```

output:

```
print one
```

output:

```
print two
```

output:

```
pic1 = media.load_picture(media.choose_file())
pic2 = media.load_picture(media.choose_file())
do_something(pic1, pic2)
media.show(pic1)
```

Does the picture that was just displayed have any red in it? Circle one: yes no

```
media.show(pic2)
```

Does the picture that was just displayed have any red in it? Circle one: yes no

Question 2. [6 MARKS]

Write a function called `rotate_rgb` that takes a `Picture` as a parameter and, for every pixel, sets the red value to the original green value, the green value to the original blue value, and the blue value to the original red value.

You will need to use one variable for the parameter and one variable for the pixel values in the for loop. You can earn the full 6 marks if you use only one more variable. If you use more than one, you can earn at most 5 marks.

```
import media
```

Question 3. [8 MARKS]

Write a program that uses `raw_input` to prompt the user for his or her income and then prints the amount of health premium owed on that income. (A health premium is a kind of tax that is used to pay for health coverage.) This program consists of two parts: a function named `health_premium` on this page and a main block on the next page.

The health premium for a given income is computed as follows:

1. For less than $25,000 income, no premium is owed.
2. For incomes of $25,000 to less than $50,000, the premium is 5% of `income`.
3. For incomes of $50,000 or more, the premium on the first $100,000 is 7%, and the premium on any income above that is 10%. The total premium owed is the sum of those two values.

Your program should ask the user for input using the string "`Please enter your income: `" and print the health premium owed as the string "`Your health premium is $XXX.YY.`" The amount printed should be rounded to the nearest cent. XXX can be as many digits as it needs to be, YY must be 2 digits long, and the total amount must be preceded by the character '$'.

```
def health_premium(income):
    '''Return the health premium owed for a given income amount. The parameter
    income is an int, and the health premium returned is a float.
    '''
```

```
if __name__ == "__main__":
```

[Use the space below for rough work. This page will not be marked unless you clearly indicate the part of your work that you want us to mark.]

Short Python function/method descriptions:

```
__builtins__:
  abs(number) -> number
    Return the absolute value of the given number.
  max(a, b, c, ...) -> value
    With two or more arguments, return the largest argument.
  min(a, b, c, ...) -> value
    With two or more arguments, return the smallest argument.
  raw_input([prompt]) -> string
    Read a string from standard input.  The trailing newline is stripped.  The prompt string,
    if given, is printed without a trailing newline before reading.
float:
  float(x) -> float
    Convert a string or number to a float, if possible.
int:
  int(x) -> integer
    Convert a string or number to an integer, if possible.  A floating point argument
    will be truncated towards zero.
media:
  choose_file() -> str
    Prompt user to pick a file. Return the path to that file.
  create_picture(int, int) -> Picture
    Given a width and a height, return a Picture with that width and height.  All pixels are white.
  get_blue(Pixel) -> int
    Return the blue value of the given Pixel.
  get_color(Pixel) -> Color
    Return the Color object with the given Pixel's RGB values.
  get_green(Pixel) -> int
    Return the green value of the given Pixel.
  get_pixel(Picture, int, int) -> Pixel
    Given x and y coordinates, return the Pixel at (x, y) in the given Picture.
  get_red(Pixel) -> int
    Return the red value of the given Pixel.
  load_picture(str) -> Picture
    Return a Picture object from file with the given filename.
  set_blue(Pixel, int)
    Set the blue value of the given Pixel to the given int value.
  set_color(Pixel, Color)
    Set the RGB values of the given Pixel to those of the given Color.
  set_green(Pixel, int)
      Set the green value of the given Pixel to the given int value.
  set_red(Pixel, int)
    Set the red value of the given Pixel to the given int value.
  show(Picture)
    Display the given Picture.
```

Last Name: _____ **First Name:** _____