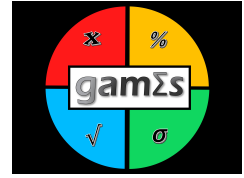# GAMES Course 2 Final Exam Solutions

Multiple-Choice

1. (d)

2. (a)

3. (b)

4. (c)

5. (b)

6. (d)

7. (d)

8. (c)

9. (a)

10. (d)

Short Answer Questions

1. (a) $\frac{0.15*0.5}{0.15*0.5+0.98*0.5} = 0.133$

   (b) $\frac{0.95*0.133}{0.95*0.133+0.005*0.867} = 0.97$

   (c) $\frac{0.05*0.133}{0.05*0.133+0.995*0.867} = 0.0076$

2. (a) c.d.f.:

x	-1	-2	0	3	4
$p(x)$	0.1	0.3	0.4	0.6	1

   (b) Mean $= 1.7$, Variance $= 6.21$, Standard deviation $= 2.49$

3. (a) (i) $F(10) = \frac{100}{400} = 0.25$, (ii) $F(10) - F(5) = \frac{75}{400} = 0.1875$

   (b)

   $$
   \begin{aligned}
   f(x) &= \frac{x}{200} \qquad \text{for } x \in [0, 20] \\
   &= 0 \qquad \text{elsewhere}
   \end{aligned}
   $$

   (c) $E(X) = \int_0^{20} \frac{x^2}{200}dx = 13.33$, $E(X^2) = \int_0^{20} \frac{x^3}{200}dx = 200$, $\text{Var}(X) = 22.31$

   (d) $x = 17.32$

4. (a) Quantitative discrete

   (b) Quantitative continuous

   (c) Qualitative ordinal

   (d) Quantitative continuous

(e) Qualitative nominal

5. (a) *Point estimate*: 12, *Standard error*: 2.4

   (b) (i) 95% CI: $[9.6, 16.8]$, (ii) 99% CI: $[5.76, 18.24]$

6. (a) Denoting μ as her approval rating, $H_0 : \mu = 0.6$ vs $H_A : \mu \neq 0.6$

   (b) $z = \frac{0.5 - 0.6}{\sqrt{0.5 * 0.5 / 36}} = -1.2$. Cannot reject H_0 at 95% significance i.e. cannot reject the hypothesis that there has been no change in her popularity.

   (c) $H_0 : \mu = 0.6$ vs $H_A : \mu \leq 0.6$.

   Same conclusion: $z = -1.2$. Now critical value $= -1.645$. Again, cannot reject H_0 at 95% significance.

7. (a) 5 centimeters

   (b) 40

   (c) $21/40 = 52.5\%$

   (d) $12/40 = 30\%$

8. (a) $\sigma_{s,m} = r_{m,s}\sigma_m\sigma_s = \sqrt{625}\sqrt{3025}\,(0.7) = 962.5$

   (b) $b_1 = 0.318, b_0 = 24.1$

   (c) \$62.27

   (d) Observations would be moderately close to the regression line which would be upward sloping.

   (e) 49 percent

9. Correlation is not causation. Even if these two phenomenon are correlated (to the best of the author's knowledge, these two phenomenon are not correlated), it could be that committing violent crimes causes people to play violent video games. Or it could be that a hidden third factor explains both behaviours.