Survey 11

* Required

1. **Please give your name** *

2. **Please give your CUHK student ID** *

3. **How much of Assignment 10 have you completed?** *
   Mark only one oval.

   - What? There is an assignment!?
   - Seen it.
   - Thought about it.
   - Tried it.
   - Finished it!!

4. **How many Course 3 Module 3 lectures have you watched?** *
   Mark only one oval.

   - None
   - 1
   - 2-3
   - All

5. **What are the main differences between a linear program and a discrete optimization problem? You can tick more than one.** *
   Check all that apply.

   - A linear program encodes only a satisfaction problem
   - A linear program can have disequality constraints
   - The constraints in a linear program are linear
   - The objective in a linear program are linear
   - The decision variables in a linear program are linear
   - The decision variables in a linear program are positive
   - The decision variables in a linear program are non-negative
   - The decision variables in a linear program are real
   - The decision variables in a linear program are faked
   - The decision variables in a linear program are integers

6. **What is the geometrical interpretation of the linear inequalities in a linear program with n variables?** *
Mark only one oval.

- ◯ A bounding box in the n+1 dimensional space
- ◯ A bounding box in the n dimensional space
- ◯ A bounding hyperplane in the n+1 dimensional space
- ◯ A bounding hyperplane in the n dimensional space
- ◯ NONE of the above

7. **Where do the feasible solutions (if exist) of a linear program lie?** *
Mark only one oval.

- ◯ The vertices of the bounding polytope
- ◯ The edges of the bounding polytope
- ◯ The origin of the n dimensional coordinate system
- ◯ The surfaces of the bounding polytope
- ◯ The interior (including the surfaces) of the bounding polytope

8. **Where do the optimal solutions (if exist) of a linear program lie?** *
Mark only one oval.

- ◯ The vertices of the bounding polytope
- ◯ The edges of the bounding polytope
- ◯ The origin of the n dimensional coordinate system
- ◯ The surfaces of the bounding polytope
- ◯ The interior (including the surfaces) of the bounding polytope

9. **Which of the following is not true about a Basic Feasible Solved Form? You can tick more than one.** *
Check all that apply.

- ☐ Basic variables appear on the LHSs
- ☐ Non-basic variables appear on the RHSs
- ☐ Constants are positive
- ☐ Has a corresponding Basic Feasible Solution
- ☐ The corresponding Basic Feasible Solution satisfies all constraints
- ☐ The corresponding Basic Feasible Solution corresponds to a vertex on the bounding polytope

10. **Which of the following is true about the pivoting step in the Simplex Algorithm? You can tick more than one. Think about why!** *
Check all that apply.

- ☐ Transform the linear program to another which has a better optimal solution
- ☐ Transform the linear program to another preserving all solutions
- ☐ Transform the linear program to another preserving only optimal solutions
- ☐ Jump from one basic feasible solution to another which has a better objective value
- ☐ Jump from one basic feasible solution to another which corresponds to a point inside the bounding polytope

11. **Why can't we use the Simplex Algorithm to solve a discrete optimization problem in general? You can take more than one.** *
Check all that apply.

- [ ] A discrete optimization problem may have non-linear constraints
- [ ] A discrete optimization problem may have -ve decisions
- [ ] A discrete optimization problem may have a non-linear objective function
- [ ] The Simplex Algorithm solves a linear program, which have real number solutions in general
- [ ] The Simplex Algorithm solves a linear program, which have non-negative solutions in general

12. **What are the main differences between a mixed integer program (MIP) and a discrete optimization problem? You can tick more than one.** *
Check all that apply.

- [ ] An MIP encodes only a satisfaction problem
- [ ] An MIP can have disequality constraints
- [ ] The constraints in an MIP are linear
- [ ] The objective in an MIP are linear
- [ ] The decision variables in an MIP are linear
- [ ] The decision variables in an MIP are positive
- [ ] The decision variables in an MIP are non-negative
- [ ] The decision variables in an MIP are real
- [ ] The decision variables in an MIP are faked
- [ ] The decision variables in an MIP are integers

13. **What is the basic working principle of the Branch and Bound Algorithm for solving MIPs?** *
Mark only one oval.

- ◯ Repeatedly dividing the MIP into small problems until an integer solution is found, and use search to find the optimal solution of the entire problem
- ◯ Repeatedly labeling variable with values and use bounding to find the optimal solution
- ◯ Repeatedly pruning away non-integer optimal solutions until the remaining problem has an integer optimal solution
- ◯ Repeatedly dividing variables domain into halves and solving each sub-problem until a sub-problem has an integer solution
- ◯ NONE of the above

14. **What is the basic working principle of the Gomory's Cutting Plane Method for solving MIPs?** *
Mark only one oval.

- ◯ Repeatedly dividing the MIP into small problems until an integer solution is found, and use search to find the optimal solution of the entire problem
- ◯ Repeatedly labeling variable with values and use bounding to find the optimal solution
- ◯ Repeatedly pruning away non-integer optimal solutions until the remaining problem has an integer optimal solution
- ◯ Repeatedly dividing variables domain into halves and solving each sub-problem until a sub-problem has an integer solution
- ◯ NONE of the above

15. **Have you attempted Workshop 11 yet?** *

Mark only one oval.

- ◯ No
- ◯ Thought about it
- ◯ Completed it

16. **How much of Assignment 11 have you completed?** *

Mark only one oval.

- ◯ What? There is another ASSIGNMENT!?
- ◯ Seen it.
- ◯ Thought about it.
- ◯ Tried it.
- ◯ Finished it!!
